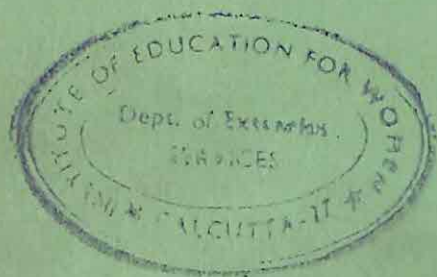


# Research in Classroom

VOLUME III



National Council of Educational Research and Training

# RESEARCH IN CLASSROOM

VOLUME 3

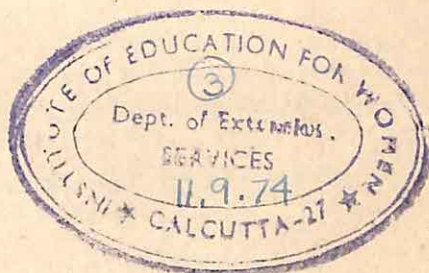
# RESEARCH IN CLASSROOM

*Reports of Experiments and Projects*

*Editors*

J. C. GOYAL

JANAK DUGGAL



National Council of Educational Research and Training

March 1972  
Chaitra 1894

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Acc No - 16888

PUBLISHED AT THE PUBLICATION UNIT BY S.A. ABIDIN, SECRETARY,  
NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND  
TRAINING, NIE CAMPUS, SRI AUROBINDO MARG, NEW DELHI-16  
AND PRINTED AT PRINTING PRESS INSTITUTE FOR THE DEAF,  
4E/6, JHANDEWALAN EXTENSION, NEW DELHI-55, PHONE : 568098



## FOREWORD

The Scheme of Experimental Projects is one of the various programmes started by the NCERT for qualitative improvement of school education in the country. The purpose of the scheme is to encourage schools to try out new ideas and find solutions to their day-to-day problems in a systematic and scientific manner by giving them academic and financial assistance.

The purpose of this publication is to give recognition to classroom practitioners who have made efforts to try out new ideas in their schools and to place their experiences before other teachers.

The book is the third in the series on the literature for classroom research. It contains selected reports of ten experimental projects conducted during the past few years by teachers under limited conditions in their schools. Therefore the reports may have some weaknesses from the viewpoint of research standards.

So far about 2000 schools have benefited from the scheme. It is heartening to note that the scheme has taken root and more and more schools are coming forward to take advantage of the scheme.

It is hoped that the publication will benefit and inspire other teachers to put forth innovative ideas.

I take this opportunity to thank the Extension Services Departments, State Departments of Education and Regional Colleges of Education for their cooperation in the execution of the scheme. I am also thankful to Dr. R.H. Dave, Dr. L.C. Singh, Shri J.C. Goyal and Mrs. J. Duggal for their efforts in bringing out this book.

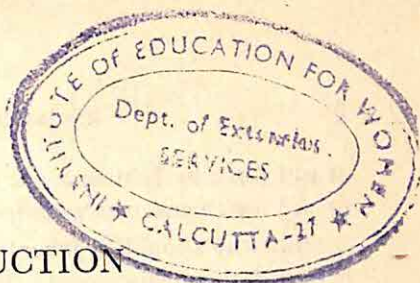
S.V.C. AIYA  
Director

30 June, 1971

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## INTRODUCTION

### **The Scheme of Experimental Projects**

The Education Commission and several other educationists have pointed out the need for qualitative improvement in education at all levels, particularly at the school level which not only forms the basis of higher education but also serves as a terminal point for a majority of students.

The enrolment of a large number of children in our schools, the increase in the number of schools and the number of teachers working in these schools have created numerous problems in education. Not only this, the development of new ideas and innovations in the field of education here and abroad have also bewildered today's teacher and the administration. On the one hand, there are problems created by the large number of children like crowded classes and double shift system in urban areas, single teacher schools in rural areas, etc. On the other hand there is a problem for teachers of grasping the new ideas like ungraded system, programmed instruction, modern mathematics, team teaching, institutional planning, school complex, work experience, T.V. teaching, integrated teaching and other such innovations, and inclusion of new contents in the subject areas.

All the above mentioned developments call for a heavy job on the part of the teacher and the administrator. Many of these problems are being solved in different ways by different agencies. But the solutions may not always be applicable in all the situations. For instance, the work experience will be introduced in city schools in a different way than in the village schools. It is for this purpose that teachers and schools have to see the problems in their own perspective and find a solution best suited to the conditions prevailing there.

It requires that teachers test the new ideas whether their own

or put forth by someone else in their own classroom situation to see for themselves whether these work or not.

But why should teachers do so and take initiative and not maintain the status quo ? This is necessary for them because :

- i) Many of them have new ideas which they want to try.
- ii) So many new ideas are pouring in to which they cannot remain indifferent, otherwise they will find themselves behind others without a place in the new setting.

However, they need some sort of encouragement and assistance to take up the challenge posed by the quantitative expansion and the new developments in the field, and to translate the ideas in actual classroom practices.

*What ?*

With the realisation of the above need, the scheme of encouraging teachers for taking up experiments and projects in schools by giving them financial help and academic guidance with the following two main objectives was mooted in the NCERT and started in 1957.

- i) To encourage the enterprising schools and enthusiastic teachers to take up projects to try out and evaluate new practices intended to bring about some improvement in classroom instruction, instructional programme, administrative practices and organizational set-up of the school.
- ii) To improve the school practices both in regard to instruction and administration through a proper follow-up of the results of projects and by institutionalizing the same.

The scheme envisages that the schools and teachers should select a problem based on their felt-need as far as possible or take up some new idea to test its feasibility in their own conditions. If the problems are their own school problems, their solutions may be immediately applicable and useful. For instance, a school has a problem of truancy among its children. If the school takes up this problem as a project, tries to find out such cases, applies some remedies and finds some of them effective, the successful remedies may be used continuously in future by the school,



The selected problems may relate to different areas like classroom instruction, curriculum, teaching methods, school organisation and administration, evaluation, instructional material, so forth and so on. In this way, the scheme is expected to improve the actual classroom and school practices. As a corollary the scheme provides other advantages also. For instance, it makes the teachers aware and conscious of classroom problems, gives them confidence that these problems can be solved, informs them that the new ideas can be put to test by them with the financial and academic guidance, educates them to solve problems in a systematic and scientific manner and last but not the least encourages them to innovate new ideas and practices.

To provide help and guidance to the teachers desirous of taking up experimental projects, resource personnel are trained who may guide the teachers in planning projects, their execution, evaluation and preparation of reports of the projects. A few such workshops have already been organised during the past few years.

In order to encourage teachers and give recognition to their work, selected reports are published in the form of books like the present one so that other teachers may also make use of the results and findings of these projects.

The scheme started with a few projects only in 1957. Since then more than 2000 schools have received financial and academic guidance from the Council through the scheme.

*How ?*

There is a procedure laid down for the functioning of the scheme. Every year the Department sends a letter sometime in the month of October to all the Extension Services Centres for inviting project proposals for the ensuing year with fresh and detailed instructions. These instructions are issued in addition to the booklet published on the scheme giving all the relevant information about it. The booklet on the scheme includes such topics as the need of experimentation in schools, types of projects, criteria for approval of projects, working out financial implications, terms and conditions of grant, procedure for submission of projects, screening of projects and their



approval, illustrative lists of topics for projects, specimen plans of projects, writing of project reports and various kinds of proformas required to be filled up in this connection.

Fresh instructions issued every year include last dates for submission of project proposals to the Extension Services Centres, State Departments of Education, Regional Colleges of Education and the Department of Teacher Education; suggestions for improvement of screening at various levels on the basis of the comments of the final screening committee of the previous year; areas of emphasis to be given during a particular year, suggestions for improvement of quality of projects, and the like.

The Extension Services Centres organise a workshop for teachers and heads of schools interested in taking up such projects to orientate them about the scheme and its working. After this workshop the schools are able to locate pin-pointed problems and plan the project proposals. A second workshop is held within a month or so to discuss and improve upon the project designs. The project proposals are then submitted by the schools to the Extension Services Centres. The Extension Services Centres form a committee consisting of some training college lecturers, resource persons trained by the Council, etc. which scrutinizes the proposals and gives its recommendations for forwarding the selected ones to the Director of Public Instruction/Director of Education of the respective State. The project proposals of such Union Territories where no Extension Services Centres have been established are directly forwarded to the concerned Regional College of Education.

A further screening of proposals is done by the office of Director of Public Instruction/Director of Education with the help of their academic wings like the State Institutes of Education. The selected project proposals are transmitted to the Regional Colleges of Education for scrutiny. A committee consisting of a number of sub-committees for different subject areas is constituted with the Principal as Chairman. This committee makes recommendations for grants and gives suggestions for improvement of projects.

Each Regional College of Education forwards the approved

projects to this Department for final screening. The project proposals received from all over the country are given code numbers and categorised subject-area-wise. A committee is formed consisting of about 20 officers which is further divided into sub-committees each having two to three persons specialised in each area represented in the project proposals. The members of this committee are drawn from various departments of the National Institute of Education, Regional Colleges of Education, Central Institute of Education, Teachers College, Jamia Millia, etc. This committee gives specific suggestions for modifications in designs, for improvement in the procedure and recommends grants with break-up for each major item for which money is required for implementation of the project.

The projects which are not found worthwhile are not approved and are returned with reasons for not being accepted and with suggestions for improvement. The information about approved projects is sent to the schools, Extension Services Centres, State Departments of Education and Regional Colleges of Education. The grants are released to the schools directly by the Council under intimation to all concerned.

#### *Other Steps Proposed*

In order to further strengthen the scheme and make it more effective, the following additional steps are being taken.

- i) It has been our observation that many teachers are not aware of this scheme and therefore are not able to utilise the opportunity. From the next year, a folder will be printed and sent out to be circulated among as many schools as possible through Extension Services Centres, Directors of Public Instruction/Directors of Education, Field Advisers, State Institutes of Education, etc. giving information about the scheme.
- ii) Synopsis of experimental projects giving the title of each, name of the investigator, year, objectives, hypothesis, findings and conclusions will be published for wider dissemination of information.
- iii) Conferences of teachers who conduct outstanding projects are proposed to be held to discuss the findings of their projects, follow-up steps to be taken and difficulties encountered in the execution of projects.



*Conclusion*

The scheme has been able to generate an interest among the teachers. It has been found that the quality of project proposals received is improving every year both from the point of view of selection of problems and their designs. The execution, evaluation and reporting of projects have also improved. However it leaves much to be desired with regard to all these aspects. Although we cannot expect any sophisticated research or experimentation by secondary school teachers as they do not have any kind of specific training in it, yet efforts are being made to make the teachers as systematic and scientific as possible in their approach to problems. The publication of this book is one of the several steps being taken to make the scheme more effective. It is hoped that the present publication will do its bit in improving the quality of education in our schools.

*J.C. Goyal*

TRYING-OUT  
DIFFERENT SYSTEMS OF  
ASSESSMENT



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1965-66

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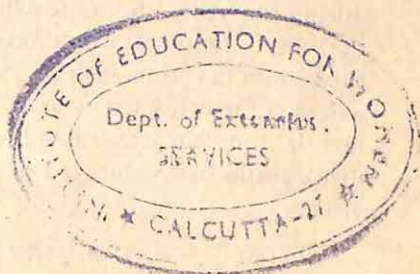
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## ACKNOWLEDGEMENTS

In designing this experiment, valuable advice was given by Prof. H.M. Dutta of B.R. College of Education, Agra, and the Extension Services Department for which the investigator expresses his gratitude to them. Shri N.S. Chauhan, Head of the Department of Psychology, Agra College, was consulted in the construction of a rating scale and in designing interviews to learn the reactions of the teachers to the different systems of assessment experimented within this project. In writing this report Miss Bonnie Mc.Dermid (U.S.A.) was consulted frequently and she made some useful suggestions.

When the report was being finalised, the investigator had it looked into by some specialists of the erstwhile Department of Field Services, National Council of Educational Research and Training. The investigator is thankful to these specialists for their advice and help, but the responsibility for all shortcomings rests with the investigator only.



## INTRODUCTION

### A Brief Retrospective

The way in which students at present get promotions from one class to another greatly influences their method of study and their real achievement. Till very recently schools promoted students entirely on the basis of their marks in the annual examination. This encourages many students not to do work regularly during the year, for they think that they can manage to get through by cramming certain important parts of the textbooks for the annual examination. To curb this tendency the State Department of Education, U.P., asked schools to hold at least two terminal examinations during an academic year and to take into consideration both these examinations at the time of promotion of students to a higher class. The first of these two examinations is held in the middle of the year and the second towards the end. They are called the half yearly and the annual examinations respectively.

### Need for the Study

In this institution a third examination was introduced in addition to the required half yearly and final examinations. We thus held three terminal examinations at equal intervals during the year. Some teachers, however, thought that even the three terminal examination system gave students two to three months time during which their work was not being assessed for being irregular in their studies. During these intervals the teachers wanted to hold monthly tests so that students could be encouraged to put in their best throughout the year.\*

Therefore this investigator planned to try out what can be described here in this experiment as a system of monthly assess-

\* Though some schools adopt the monthly test system, seldom is an effort made to find out its effectiveness through an experiment.



ment. He was aware that a large number of the students in his school were coming from the homes of working class people. Due to lack of encouragement at home, the achievement of these students was rather low and they were very irregular in their studies. He thought, therefore, that if the students were given credit for the assignments which they did in their daily work in the school, they might be encouraged to be more regular in their work. This system would also give the teacher an opportunity to review their class work and adjust his teaching accordingly. It was, therefore, decided that rather than taking monthly tests, some students might be given marks for the assignments done by them during each month.

### **Purpose of the Study**

The present experiment was designed to test the effectiveness of three different systems of assessment. These three systems are : (1) the three terminal examinations system, (2) the monthly assessment system and (3) the monthly test system. In addition, teachers' views were to be sought as to which system involved the highest work-load for them and which one the teacher would ultimately recommend for adoption in view of the existing conditions in the school.

### **Hypotheses**

The following three hypotheses were to be tested through this study.

- (i) Under the existing school conditions conducting of the monthly tests will increase the achievement of the students as compared with the holding of terminal examinations only.
- (ii) Under the existing school conditions the monthly assessment of work done by students will increase their achievement compared with the holding of terminal examinations.
- (iii) That under the existing school conditions the monthly assessment of work done by students will raise the achievement of students compared with the taking of monthly tests.

### Delimitations

(a) This study was conducted in three sections of class eight only.

(b) Achievement of students was measured in terms of examination marks only so far as the main hypotheses of the experiment were concerned.

### PROCEDURE

(i) *Formation of the Experimental and the Control Groups* : Students promoted from the three sections of class seven were grouped into three comparable sections of class eight. These sections were made comparable by equalising them on the basis of the mean and S.D. of their aggregate marks in class seven in all the subjects. Since there are four sections in class eight, newly admitted students were put in the fourth section. The first three comparable sections were called sections A, B and C of class eight meant for three usual examinations, the monthly assessments and the monthly tests respectively. There were fifty students in each of these sections.

(ii) *Arrangement of the Different Systems of Assessment* : In section A only three terminal examinations were held at equal intervals during the year. The first was called the first terminal examination, the second was called the half-yearly examination and the third was called the annual examination. The marks allotted to each of these examinations were forty, sixty and hundred respectively. In Sections B and C, the first terminal examination was dropped. It was replaced with monthly assessment in Section B and with monthly tests in section C.\*

(iii) *Monthly Assessment* : In Section B monthly assessment of the work of the students was done on the days on which students of Section C took their monthly tests. Under this system each subject teacher gave marks to the students on the basis of the work done by them during the month and for their regularity. The exact criteria were discussed

\* Six monthly tests were thus held in Section C, one at the end of each month. In Section B, monthly assessment was done instead of monthly tests.



periodically in staff meetings, but their broad outlines are as follows:

(a) Two-thirds of the total marks were assigned for the quality and quantity of the writing and reading assignments done by the students under the guidance of the teacher at school and at home. The teachers were expected to review and grade these assignments and to convert these grades into marks at the time of monthly assessment.

(b) One-third of the marks were allotted on the basis of their ability to answer questions put to them by the teachers in the class. The teacher was thus supposed to make an estimate of the knowledge of students during the course of his teaching and convert it into marks at the end of each month. Personal notes about students were recorded by their teachers in their diaries periodically.

Monthly tests were given in every subject under the supervision of the subject teachers and were conducted in the classroom, usually on the last two working days of the month. The tests covered all the important aspects of the material taught to the students during the month. They contained both objective and essay type questions. The duration of the tests was an hour per subject. The answer books were scored by the teachers and shown to the students. The marks obtained by them were entered on the mark slips and handed over to the examination superintendents.

The half-yearly examination was held in these two sections as required under rules of the State Department of Education, and also because in its absence students of these sections would have lost practice of appearing at long duration examination, sitting for three hours in each paper when their final achievement was to be evaluated on the basis of annual examination.

(iv) *Courses of Study and Teachers* :—The courses of the different subjects and the textbooks were the same in all the three sections and were in accordance with the requirements of the Department of Education.

The experiment covered all the compulsory and optional subjects taught to students of class eight. As far as possible same teachers taught their subjects in all the three sections,



employed similar methods of teaching and gave equal time and attention to the students. Whenever this was not possible, comparable teachers were employed to teach a subject in different sections.

(v) *Methods and Tools for Data Collection* : The achievement of students of the three sections was compared on the basis of the marks they obtained in the annual examination. These examination papers were of three hour duration each, and they contained both objective and essay type questions.

### Teachers' Opinions

Reactions of the teachers were obtained through a five-point rating scale. The scale was issued to teachers soon after the annual examination. It was issued to fifteen teachers engaged in teaching all the three groups. They had more than three years teaching experience in the institution. Teachers were asked to rate the three systems of assessment with regard to the following:

- (i) Regularity: This was to be ascertained whether or not the students did their assignments of reading and writing, within the time specified by the teachers. To facilitate it, the students of all the three sections were required to maintain an index of all the assignments done by them.
- (ii) Work-load of teachers : This was to be estimated on the basis of the time spent by the teacher in correcting the written work done by the students of the three sections. Correction of the written work included the time spent by the teachers in correcting assignments, and in marking test and examination copy-books.\*
- (iii) Feasibility : The teachers were to indicate their preference for adopting these three systems of assessment in the light of the following factors :
  - (a) There are forty-five to fifty students in each class.
  - (b) The seating arrangement is crowded.

\* A strict numerical count of the assignments done by the students in the three sections could not be kept by all the teachers, but the maintenance of such indexes by the students facilitated the work of the teachers in forming their opinion as to how regular the students were in their studies.

- (c) Adequate printing facilities are not available within the school to print test papers and assignments frequently.
- (iv) Better Instruction : The teachers were asked to give their opinion about the relative efficiency of the three systems of assessment in encouraging the students to gain a true understanding of the subject matter and to form desirable study habits in addition to high examination scores.

### ANALYSIS AND INTERPRETATION OF THE DATA

The investigator separately analysed the data regarding achievement of students and those regarding the reactions of the three systems of assessment. Interpretations based on the two types of analyses have also been given separately in the report. On the basis of these two types of interpretations the investigator drew conclusions.

#### (1) Data Regarding Examination Scores of Students

(a) *Method Used* : Marks of all the students of a section in all the subjects were added together and their mean and standard deviations were calculated. The same procedure was adopted in regard to the marks of students in all the three sections of class eight under this experiment. Then the critical ratio between the mean scores (average scores) of the students of the three groups was calculated to find out the statistical significances, if any. Table I below gives the results of the analysis of the half-yearly examination and Table II of the annual examination. Interpretations were, however, based only on the scores of the annual examination. In the second terminal examination the total number of marks per subject was 60 and the aggregate was 480. In the annual examination the total number of marks per subject was 100 and the total was 800.

TABLE I  
HALF-YEARLY EXAMINATION MARKS

<i>Sections</i>	<i>Mean</i>	<i>Standard Deviation</i>
A	161.74	51.80
B	168.09	46.00
C	146.09	46.80



TABLE II  
ANNUAL EXAMINATION SCORES

<i>Sections</i>	<i>Mean</i>	<i>Standard Deviation</i>
A	316.00	79.50
B	330.15	86.00
C	291.00	90.00

### Critical Ratios

- Between A and B Sections .78 not significant  
 Between B and C Sections 2.05 significant at 0.05 level  
 Between A and C Sections 1.35 not significant

### (b) Statistical Analysis of Examination Scores :

- i) In comparing sections A and B the mean of the scores of the students for Section A is 316.00 and the S.D. is 79.50. The mean of the scores of students of Section B is 330.15 and the S.D. is 86.00. The critical ratio in favour of Section B is only .78 and is therefore not significant.
- ii) In looking at sections A and C we find that the mean of the scores of the students of Section A is 316.00 and the S.D. is 79.50. The mean scores of students of Section C is 291.00 and S.D. is 90.00. The critical ratio in favour of Section A is only 1.35 and therefore not significant.
- iii) For section B and C the mean of the scores of the students of Section B is 330.15 and the S.D. is 86.00. The mean scores of the students of Section C is 291.00 and the S.D. is 90.00. The critical ratio in favour of Section B is 2.05 and therefore significant at .05 level.

### (2) Interpretations

- i) In the annual examination there was no significant difference between the average performance of students of the three terminal examinations system and the monthly test system.
- ii) In the annual examination there was no significant difference between the performance of the students of

the three terminal examination system and those of the assessment system.

- iii) In the annual examination there was a significant difference between the average performance of the students of the assessment system and the monthly test system. The results were in favour of the former.

*(c) Analysis of the Data Regarding Reactions of the Teachers*

i) Ratings: A five-point rating scale was issued to all the fifteen teachers who were teaching the three sections. Their ratings were converted into marks and the following results were obtained.

TABLE III

<i>Systems of Assessment</i>	<i>(Marks out of 100)</i>			
	<i>Regularity</i>	<i>Work load</i>	<i>Convenience</i>	<i>Better Instruction</i>
Three Terminal Examination	46	60	74	53
Assessment of work	82	72	70	56
Monthly Tests	72	62	60	78

ii) Interpretations: The above scores are based on a maximum of 100 points allotted for each purpose. These are based on the ratings of ten experienced teachers, who were engaged in teaching the three groups. Since the sample was small, further statistical treatment was not given to the data. However the findings are as follows :

a) The students of the assessment group were found most regular; those of the monthly test group and the three terminal examination groups ranked second and third.

b) The teachers had the highest work-load in the assessment group.<sup>1</sup> The work-load of the teachers in the monthly test

1. The marks so obtained actually were out of fifty for each attribute but the respective totals have been doubled for convenience.



group was slightly higher than that in the three terminal examination group.

c) The three terminal examinations system of assessment was found most feasible by the teachers for being adopted in the school. The monthly assessment system was considered by them only a little less feasible. The monthly test system ranked third in this respect.

d) From the point of view of better instruction, the teachers considered the monthly test system the best. The assessment and the three terminal examination system ranked second and third in this respect.

The investigator subsequently conducted interviews with these teachers for clarifications and obtained the following supplementary information :

- i) They regarded the monthly test system as being most helpful for better learning. The reason given by them was that under the assessment system students managed to copy assignments from other students and thus it resulted in shallow learning.
- ii) The teachers were asked why they held the view that the monthly test system encouraged better learning when the average score was lowest in this year. The teachers' view was that the monthly test system had not been very helpful in raising the achievement of the students because the tests proved too difficult for the majority of the students. This resulted in failures of a large number of students and consequently they were discouraged.
- iii) They were of the opinion that on the whole, the weaker students got more encouragement under the assessment system because they were continuously getting credit for whatever work they did on assignments from the teachers.
- iv) The teachers were strongly of the opinion that the monthly test system and the assessment system could only be tried with success with smaller classes of twenty-five to thirty students.



### CONCLUSION

The investigator found that on the basis of the statistical analysis, it could not be said that any one of these three systems of assessment was superior to the remaining two. But this much could be said under the conditions prevalent in this school that the monthly assessment system was more effective in raising achievement than the monthly test system and that the hypothesis number III is proved.

The investigator further examined the frequency distribution for the scores of the three sections of the students. He found that there were comparatively fewer students towards the lower end of the frequency distribution of the assessment group than there were in the frequency distributions of the monthly tests and three terminal examination groups. It might be inferred that weaker students are more benefitted through assessment system and review of their assignments which was an assumption of the investigator.

The investigator is aware that a longitudinal study of the progress of individual students in each of the three sections would have given additional information but it was beyond the scope of this study.

The investigator examined the supporting data obtained through the analysis of the rating scale and interviews on which the opinion of ten teachers teaching all the three sections was gathered. It appeared that the teachers had realised that monthly assessment of work best helped the students to be regular in their work all through the year. But this and the monthly test system entailed a much heavier work load on them compared to the three terminal examination system. The latter system was thought by them to be the most practicable. The teachers also seem to have realised the need to improve the monthly tests and bring them more in line with the average attainments of the students if they were to be tried out in future with hope of raising the achievement of students.

### FOLLOW-UP PROGRAMME

As regards the follow up, the following decisions were taken in the staff meeting of the school.

- i) Considering the advantages and disadvantages of the

three systems of assessment, teachers decided to have two terminal examinations in a year, and also have tests and assessments alternately in all the subjects every month. These tests and assessments will account for fifteen per cent of the aggregate marks on which the promotion of a student was based.

However, in the subsequent year the teachers decided to drop the monthly tests and instead have three terminal examinations. The desirability of having assessment of work every month was admitted, but in order to keep teachers' work load reasonable, they decided to have a comparatively fuller assessment of all the written work done by the students during the term. Three days in each term, preceding a terminal examination, are given to this work. Fifteen per cent of the aggregate marks are assigned for this assessment. The institution has a departmental system of supervision of teachers' work. Every time a teacher who gives over seventy per cent marks in assessment to a student has to draw a red circle over the corresponding entry of marks in his teaching diary. The Departmental supervisors discuss matters with the teacher if too many students get too low or too high marks. While counter-signing teachers' diaries, on which assessment marks are maintained, the Principal also keeps a check on the distribution of assessment marks. Even this, rather unsophisticated check supplemented with periodical discussions about assessment criteria, seems to work well.

ii) It was noted by the teachers that the holding of the monthly assessments and tests would mean more work for them. They, therefore, decided to try-out different ways of effectively correcting different types of assignments in a large class in comparatively lesser time. This work has already been undertaken by the Hindi and English departments of the school.

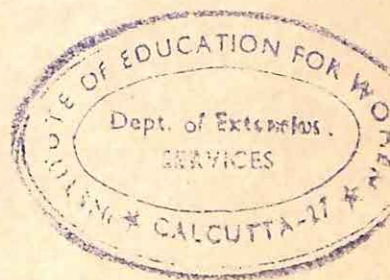


Project Report 2

DIAGNOSTIC AND REMEDIAL TEACHING  
OF GENERAL SCIENCE IN  
STANDARD VIII



M.D. VYAS



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Ahmedabad  
GUJARAT  
1965-66

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## ACKNOWLEDGEMENTS

The investigator acknowledges with gratitude the assistance and guidance provided by Dr. K.G. Desai, Principal, A.G. Teachers' College, Ahmedabad and the Coordinator of the Extension Services Department, A.G. Teachers' College, Ahmedabad in carrying out the project work.

## I. INTRODUCTION

### Origin of the Problem

The investigator has been teaching science to the pupils of standards VII, VIII and XI. Pupils of standard VII were weak in science. Some of them did not have proper attitudes towards learning and some had developed wrong concepts. Thinking that this would interfere with all the future learning of the pupils, the investigator decided to tackle the problem in the standard, VIII i.e. in the beginning of the secondary stage of education.

### Objectives

The specific objectives of the project were :

- i) To identify the low achievers in science
- ii) To find out the causes of their low achievement in science
- iii) To implement the ways and means to remedy these causes

### Delimitations of the Study

- i) The work was limited only to the teaching of general science.
- ii) The experiment was restricted only to the ninety-one pupils of standard VIII.
- iii) The diagnostic tests used were only the teacher-made tests.

### Definition

*Low achievers* : Those pupils who scored low at the examinations and those who could not answer satisfactorily the questions asked by the teacher in the class were considered as the low achievers.



## II. PROCEDURE

### Locating the Low Achievers

In order to find out the low achievers in science, the annual results of class VII were taken as the base. In addition to this a test in science was administered to all the ninety-one pupils of standard VIII (including the repeaters). From the study of above two results, fourteen pupils were found who were lowest in achievement. This included eight pupils from those promoted to standard VIII and six pupils from the repeaters.

### Studying the Causes of Low Achievement

The low achievement may depend upon (1) intellectual factor, (2) socio-economic factors and (3) emotional factors.

So first of all intelligence test was administered to all the ninety-one pupils. Dr. Desai's test is a standardized group test of intelligence. Case studies of these fourteen pupils were also made.

### Providing Learning Situations

The curriculum of science of standard VIII was divided into five major units. These five major units were further divided into fourteen smaller units.

After this all the five science teachers of the school met several times and made a list of concepts to be developed.

Following methods were used to provide the learning situations:

- (1) Demonstration of experiments and questioning
- (2) Group discussions
- (3) Gathering information about the topics and making collection of specimens
- (4) Reading the articles written by students in the class
- (5) Preparing of models and charts
- (6) Performing certain experiments
- (7) Working on assignments

### Preparing Diagnostic Tests

All these fourteen units were divided into six parts for

convenience. Each unit was taught according to the methods given above.

At the end of each unit, the teacher-made diagnostic tests were given to the pupils. The tests on each unit are given in the appendix. These tests were prepared by all the five science teachers during several meetings. While preparing the tests, they kept in view the list of concepts required to be developed in the pupils. These tests were examined by the investigator. Thus all the six units were covered during the year. It was found that some of these fourteen pupils showed good performance in some tests, while some other pupils of the class showed low achievement. The class notes of these low-achievers were thoroughly examined by the teacher and their habits of working were also investigated.

#### - Application of Remedial Measures

With the help of these diagnostic tests and oral questioning, the wrong concepts were listed. During the next period of teaching (in second unit) the teacher spent some time in correcting wrong concepts by applying suitable remedial measures.

These concepts were developed again through regular planning and effective methods of teaching including the use of audio-visual aids, excursions, etc.

In order to evaluate whether the wrong concepts were removed, the pupils were tested orally as well as by giving assignments of drawing charts, preparing models and arranging exhibitions.

### III. PRESENTATION AND ANALYSIS OF THE DATA

During the year of the project six diagnostic tests were given. Before that a test was given in the beginning. The fourteen low-achievers were specially attended to, as shown earlier. During the remedial work, all the ninety-one pupils were well attended to and their wrong concepts were removed.

The mean scores of all these six tests as well as that of the previous class test were calculated. Standard deviations were also calculated.



Table I  
A STATEMENT SHOWING MEANS AND STANDARD DEVIATIONS  
OF THE TWO CLASSES

	<i>Test</i>	<i>Mean</i>	<i>S.D.</i>
<hr/>			
Class VIII A (N=46)	Annual Test of Std. VII	53.80	9.05
	Test 1	49.50	3.13
	Test 2	54.75	3.06
	Test 3	66.75	1.80
	Test 4	66.00	3.50
	Test 5	63.50	7.50
	Test 6	75.00	2.52
<hr/>			
Class VIII B (N=45)	Annual Test of Std. VII	54.50	11.30
	Test 1	46.60	2.60
	Test 2	65.90	3.90
	Test 3	75.70	2.94
	Test 4	75.20	2.88
	Test 5	65.00	1.95
	Test 6	75.00	2.94
<hr/>			

The above table shows the means and standard deviations of the tests for the two classes of pupils.

From the above table, it will be clearly seen that the mean scores of the classes have gradually increased. By the end of the year the class mean in science increased a great deal.

It may be argued that the tests may be easier. But care was taken and it was seen that the tests were not easier. One reason for the rise in the mean may be that all the pupils were conscious of the experiment and they might have put in extra labour and this might have also contributed somewhat to the rise of the mean score.

In addition to these the usual three tests were given. To study the progress of the fourteen low achievers their results of the three tests were separately recorded.

The following table shows the marks obtained by the fourteen low-achievers in these three tests in science.

Table 2

STATEMENT SHOWING THE MARKS OF 14 LOW-ACHIEVERS  
IN THREE TESTS

<i>Student Number</i>	<i>Test I</i> (50 marks)	<i>Test II</i> (60 marks)	<i>Test III</i> (70 marks)
1	05	26	12
2	06	34	32
3	26	25	26
4	07	21	15
5	05	21	31
6	11	30	40
7	11	22	34
8	04	26	07
9	11	28	31
10	18	34	31
11	15	24	36
12	12	37	19
13	04	05	09
14	08	26	42

This table also shows that there is obvious improvement in most of the fourteen pupils. No doubt a few of them have not been lifted to the normal level, yet we can see an overall improvement.

#### IV. CONCLUSIONS AND FOLLOW-UP

##### Conclusions

- (i) In general, the method of diagnosis and remedial teaching helps the pupils to progress in a better way.
- (ii) The method of diagnosis and remedial teaching helps the low-achievers to improve their learning.

(iii) It is found that if special attention is paid to the weak pupils and if guidance is given to them, they can show progress.

### **Difficulties Encountered by the Teacher**

(i) It was the first experience of the teacher in teaching the subject by the new approach. Therefore he found it very difficult to adjust the activities of each unit within the allotted time. Each unit took more time than usual.

(ii) Cooperation from some parents was not satisfactory. Out of the fourteen weak pupils, parents of only four could be contacted with great difficulty.

(iii) For low achievement, some of the causes may be undernourishment, defects of eye-sight, etc. These difficulties could not be studied.

### **Follow-up**

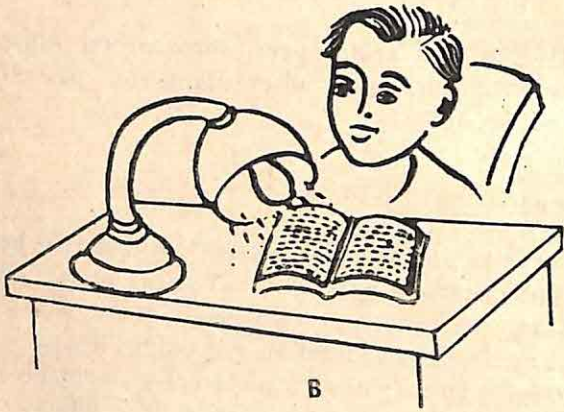
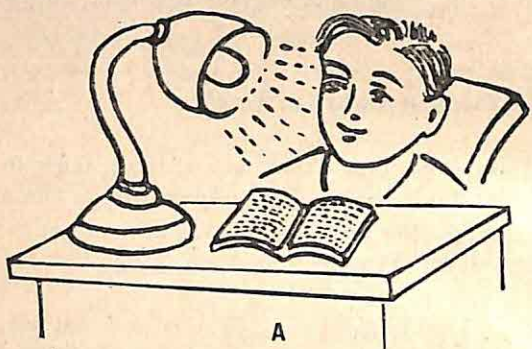
After completion of this experiment, it has become the normal practice for the science and mathematics teachers to give a test to the class at the end of each unit. They note down the deficiencies and before proceeding further, try to remedy them. This is not done on the exact scientific lines of a project. But the spirit of the principle is followed well by most of the teachers teaching the above subjects. .



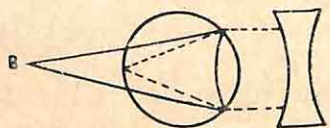
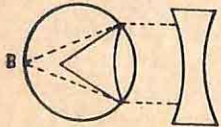
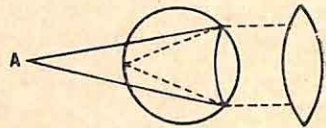
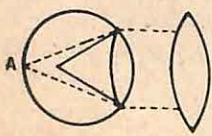
APPENDIX

TEST I

Q. I. Examine the following figures and strike off the statement that is not applicable.



(1) To read A/B is the proper situation because.....



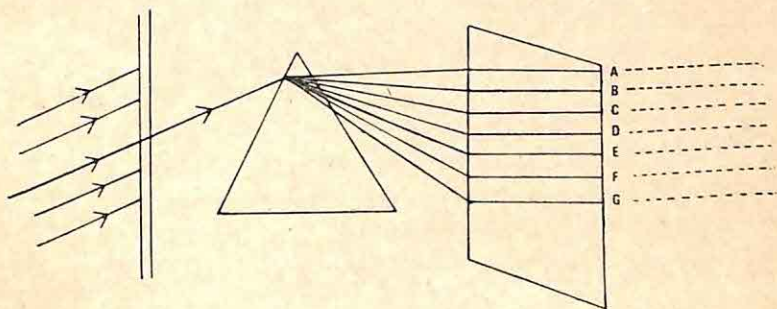
(2) The correct figure is A/B. This defect is of long/short sight.  
(3) The correct figure is A/B. This kind of defect is of long/short sight.

Q. II. Fill in the blanks with appropriate words given in brackets in the following statements comparing the eye with the camera.

- (i) In the camera there is convex lens while in the eye there is.....
- (ii) In the camera the reflection of a thing is converted, in the eye the reflection of a thing is.....
- (iii) In the camera by adjusting the convex lens forward or backward the image is obtained on the plate while in the eye.....clear image is seen on the retina by.....
- (iv) In the dim light there is a device of making the hole of the diaphragm of the lens big or small while in the dim light the.....of the eye becomes big or small.

(inverted, convex, lens of the eye, pupil, thick, thin)

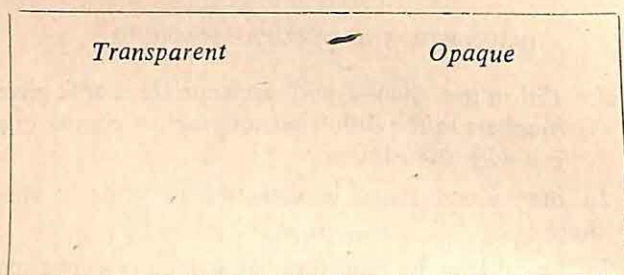
Q. III. Fill in the blanks in the following figures a,b,c, d,e,f,g with the names of the colours that can be seen in the spectrum and put those colours in the spectrum.



(red, green, yellow, orange, blue, violet, indigo)

The experiment mentioned above was first made by a scientist named Galileo/Newton. From it he proved that the white light.....

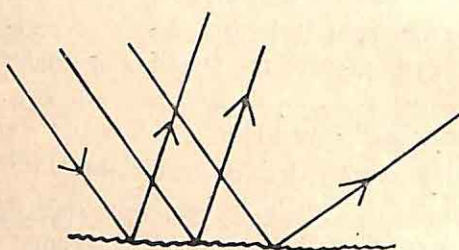
Q. IV. Below are given some objects. Classify them into transparent and opaque substances in the following table :



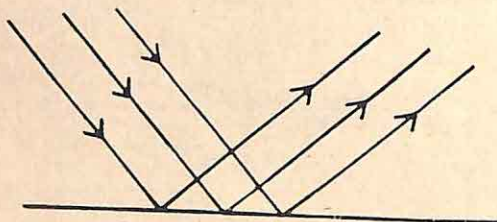
(Wood, Glass, Water, Wall, Air, Oil, Book)

### TEST II

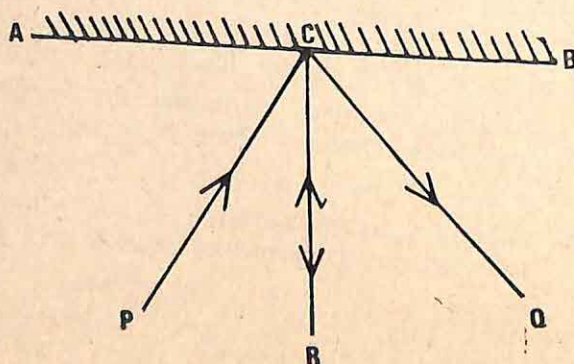
Q. I. Examine the figures and write down the kinds of reflection.



(1) .....reflection.



(2) .....reflection.





Q. II. Examine the last figure on page 32 and put appropriate names in the blanks.

AB is a.....plane

Point C is.....

PC is a.....ray

CQ is a.....ray

$\angle PCR$  is an.....angle

$\angle QCR$  is a.....angle

Write down the laws of reflection.

- 1.
- 2.
- 3.

Q. III. Fill in the blanks in the following sentences with appropriate word from those given in the bracket.

1. In a Kaleidoscope there is an angle of..... between two mirrors.
2. If we stand between the two parallel mirrors in a barber's shop, we can see our..... images in two mirrors.
3. The periscope is mostly used in.....
4. If two mirrors are put at the angles of 10, 36 & 72 the images of an object kept between those two mirrors will be....., ..... and .....  
(an aeroplane, a ship, submarine, 72,60,4,10,35,9 & innumerable)

Q. IV. (a) Draw the complete figure of a pin-hole camera and state what kind of image is formed in it.

(b) Which is the appropriate instrument out of the following to obtain light.

- (1) a match box (2) a candle (3) a lantern (4) a spirit lamp.

## TESTS III &amp; IV

**Digestive & Excretory Systems and Their Diseases**

Q. I. For each of the following three reasons are given.  
Put a tick mark against the most appropriate ones.

(a) If the mouth is very dry one does not feel the taste of dry things because.....

- (1) the dry food had become tasteless
- (2) the taste buds do not work
- (3) taste can be recognised if the substance dissolves

(b) The broadest part of the digestive channel is.....

- (1) Stomach
- (2) Duodenum
- (3) Large intestine

(c) All kinds of food are digested in.....

- (1) the stomach
- (2) the small intestine
- (3) the big intestine

(d) The longest part of the digestive system is.....

- (1) the appendix
- (2) the small intestine
- (3) the big intestine

(e) The work of extracting urine from blood is done by

- (1) the kidney
- (2) Sweat glands
- (3) Urinary bladder

Q. II. Fill in the blanks in the following sentences with appropriate words from those given in brackets against each.

(1) The hardest substance of a tooth is.....  
(Dentine—Enamel)

(2) In the mouth.....is turned into sugar  
(Starch, Protein)

- (3) The work of collecting urine is done by.....  
(Kidney, Bladder)
- (4) The collection of surplus sugar is done by.....  
(Pancreas, Liver)
- (5) By metabolic process of protein.....is created  
(Urea, Carbon dioxide)

Q. III. In column 'A' below the names of various organs are given and in column 'B' their functions are listed. Select the correct function for each organ from those given in column 'B' and write its number in the brackets given alongside each organ in column 'A'.

Column 'A'	Column 'B'
( ) Mouth	1. Absorption of water and salts
( ) Stomach	2. Digestion and absorption
( ) Small Intestine	3. Passage of food to stomach
( ) Large Intestine	4. Protein digestion
	5. Partial digestion of starch
	6. Exit of wastes

Q. IV. (a) Draw the figure of kidney and show therein the following parts :

1. Bladder    2. Urine tube    3. Malphigian bodies  
4. Right & left Kidney.

(b) Draw a figure of skin and show therein the following parts:

1. Perspiratory tube    2. Sweat gland    3. Fatty cells  
4. The nerves of touch

Q. V. Give reasons for the following statements :

1. Cellulose products like leafy vegetables should also be taken as food.
2. One should not visit a person suffering from small-pox.
3. Cooked rice without removing boiled water is better food than cooked rice from which boiled water is removed.



## TEST-V

## Magnetism

Q. I. Define the following :—

Pole, Axis, Magnetic lines of force, Magnetic field

Q. II. Draw a neat diagram showing magnetic lines of force of a magnet kept in the positions given below :—

- (i) Around a horse-shoe magnet
- (ii) Between two unequal poles
- (iii) Between two equal poles

Q. III. Fill in the blanks with appropriate words from the bracket.

(a) If a magnet is kept so as to move freely, it remains steady in.....direction. (any direction, South-East, North-West, North-South, East-West);

(b) If a magnet is cut into two pieces

- (i) We get two magnets
- (ii) Magnetism is lost
- (iii) North pole and South pole are separated.

(c) The direction of the lines of force around a magnet is

- (i) from South to North
- (ii) from North pole to South pole
- (iii) from North to South

(d) The real test of the magnetism in iron lies in

- (i) Keeping the piece of iron north-south
- (ii) attracting iron
- (iii) in showing repulsion with another magnet

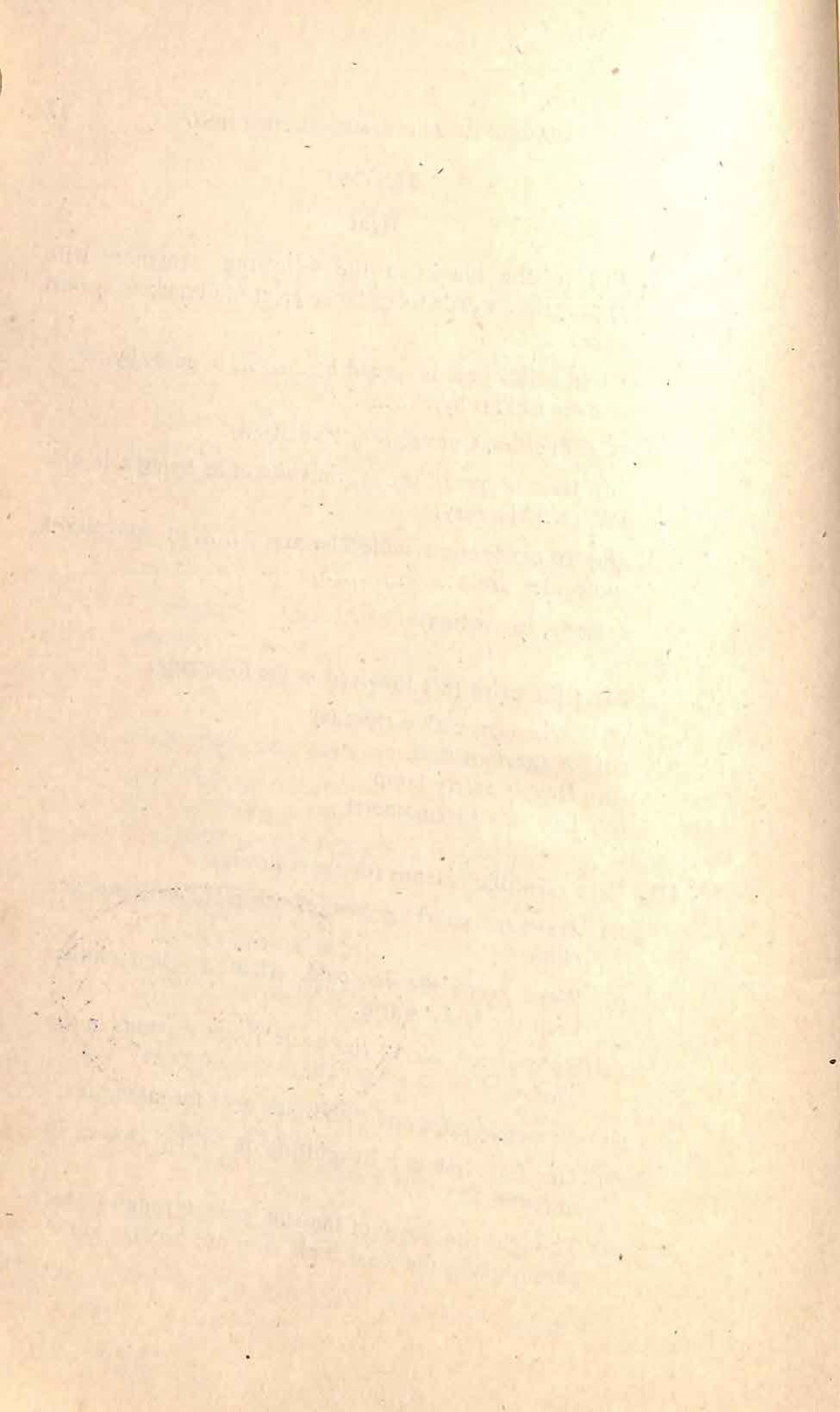
Q. IV. State the kinds of magnets.

Q. V. Mention four important uses of the magnet.

## TEST VI

## Heat

- Q. I. Fill in the blanks in the following sentences with appropriate words from those given in brackets against each.
- (i) In solids heat is spread by....., in gases by..... and in liquids by.....  
(Conduction, Convection, Radiation)
  - (ii) Heat is spread in.....in spite of its being a liquid.  
(Water, Mercury)
  - (iii) In conduction molecules are....., in convection molecules are.....  
(steady, in motion)
- Q. II. State the principles involved in the following:
- (i) A lantern with a chimney
  - (ii) A thermos flask
  - (iii) Davy's safety lamp
  - (iv) Doctor's thermometer
- Q. III. Give scientific reasons for the following :
- (i) Hawkers cover a box of icecream with woollen cloth.
  - (ii) Wool keeps the ice cold, while woollen clothes keep the body warm.
  - (iii) In summer, air in the cycle tubes expands in the sun.
  - (iv) Porcelain cups and dishes are used for taking tea.
  - (v) One feels less hot by putting on white clothes in summer.
  - (vi) Though the rays of the sun pass through transparent glass, the glass itself does not become hot.



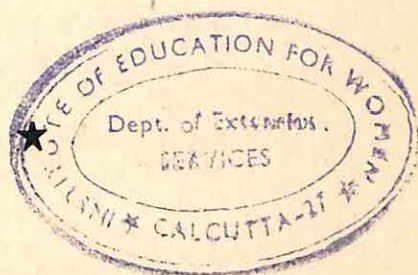


Project Report 3

A COMPARATIVE STUDY OF ACTIVITY  
AND CONVENTIONAL METHODS OF  
TEACHING ENGLISH



(K.M.) M. GILL



Model Multipurpose Higher Secondary School  
Jabalpur,  
MADHYA PRADESH  
1966-67

## ACKNOWLEDGEMENTS

The investigator owes a special debt to Prof. D. Dayal, Prantiya Shikshan Mahavidyalaya, Jabalpur for his help and guidance in conducting the study. She is highly obliged to Shri S. P. Nigam, Principal, M.M.H.S.S., Jabalpur, for permitting her to conduct the experiment in his school.

## I. INTRODUCTION

### **Need for the Study**

In view of the fact that English teaching often falls short of the desired goal, there is an urgent need to devise ways and means of imparting knowledge of the language as effectively as possible.

The determination of the role of activities in the teaching of English has long been a perplexing problem for the teachers of English. Whether curricular activities are of any value in the field of English teaching is still a moot question. But it can not remain so any longer. The rising trend in favour of activity methods impels us to scientifically determine their worth and practicability, if any, before we fully accept or reject them. The investigator being keenly interested in making the teaching of English as effective and interesting as possible undertook this project to explore new avenues in the science of methodology of teaching to improve the quality of her instruction.

### **Historical Background**

The efficacy of activity method was tested by Shri B.M.S. Gontiya in the field of Hindi teaching (M.Ed. dissertation submitted to the University of Jabalpur, 1964) which induced the investigator to try it in the field of English teaching also.

### **The Purpose of the Study**

The purpose of the study was to determine whether improved language skills could be developed at the class IX level by incorporating activities while teaching English.

### **Hypotheses**

(i) Instruction through activity method will yield better results in the four basic language skills (reading, writing, speech and comprehension) than the conventional method of teaching English.



(ii) Instruction through activity method will have positive effect on reading comprehension of the pupils.

(iii) Instruction through activity method will also improve reading speed of the pupils.

### Definitions of the Terms Used

(i) The term *activity method* connotes teaching of English by engaging the pupils in some activity pertaining to the subject. The activities were not to be spontaneous necessarily but well planned and organised to interpret the contents of the prescribed syllabus and books. For example, dramatisation, dialogues, role playing, short story competitions, poetry recitation and language games.

(ii) The term *conventional method* connotes the usual method of teaching English based on five Herbartian steps. The lesson starts with a preparatory stage followed by a statement of aim, etc. In general it is a questionnaire-cum-lecture method.

### Delimitations of the Study

(i) The experiment was confined to class VIII only.

(ii) Due to limitation of time the experiment was conducted from 1 October 1966 up to the end of January 1967 i.e. for about four months only.

(iii) The students were equated broadly as point to point equating was not possible.

(iv) It was assumed that all the four basic skills of the language i.e. comprehension (oral and written) reading, writing and speech will be developed through the teaching but only three could be evaluated, as there was no proper measuring instrument available for speech and oral comprehension.

(v) Tests given were mainly teacher-made tests, hence validity of the results is not confirmed.

## II. PROCEDURE

### The Sample

Class IX was selected for the purpose. Section 'C' served as the experimental group while section 'D' remained the control group. There were 50 students in each section. The

number was reduced to 47 since while forming the matching pairs three students were left out from each class due to the lack of required matching traits. It was a random sample since no particular criterion was used for the formation of sections.

### Equating of the Groups

The groups were equated on the basis of the following :

- (i) Basic attainment in English
  - (ii) Intelligence (Progressive Matrices by J.C. Raven)
  - (iii) Age
  - (iv) Socio-economic status
- (Kuppuswami's socio-economic status scale was used)

### The Experimental Design

Parallel group design of experimentation was adopted. The mean scores of the two groups in the above traits are as under.

	<i>Experimental group</i>	<i>Control group</i>
1. Intelligence	27.87	28.40
2. Basic attainment	69.49	71.15
3. Age	13.75	13.75
4. Socio-economic status	14.89	13.79

Two equated groups were formed having all other variables in common except one i.e. the teaching method.

### Control of Conditions

(i) *Equal Number of Periods* : Equal number of periods were allotted to each class for the teaching of English.

(ii) *Contents* : Both the groups were taught the same contents and courses.

(iii) *Tests* : The same achievement tests were given to both the groups on the same day.



(iv) *Evaluation* : The evaluation of the test papers was carried out by a third party to avoid any subjectivity on the part of the investigator.

(v) *Teacher's Bias* : Although both the groups were taught by the investigator she always tried to have an objective view of the situation and remain unbiased so that this element may not vitiate the results in any way.

### **Tools used**

(i) *Instruments Prepared by the Investigator* : The investigator prepared six achievement tests and a socio-metric scale. A sample achievement test is given in Appendix-I and the socio-metric scale in Appendix-II.

(ii) *Instruments Borrowed and Used in Original* :

- a) Progressive Matrices 1956 (Non-Verbal Test of Intelligence)
- b) B. Kuppaswami's scale of socio-economic status was used.

(iii) *Other Sources and Methods of Collecting Data* : Besides the above mentioned tools the investigator also used the following sources for collection of the relevant data.

- a) The school records to compare the average age of the two groups.
- b) The school library for furnishing extra books to the experimental groups.

### **General Plan of the Experiment**

At the very beginning a pretest was given to both the groups. Their knowledge of English was compared and the investigator commenced with the work of teaching by the two different methods, i.e. by conventional method in the control group and by activity method in the experimental group. Every fortnight the groups were given the same achievement test and their progress was recorded. In all, six achievement tests were given, the sixth one being the post-test. Statistical analysis of the results was done and conclusions were drawn on that basis.

### **The Nature of Activities**

The following activities were taken during the course of the experiment :



- (i) Classroom question time
- (ii) Dramatization
- (iii) The class story hour
- (iv) Short story competitions
- (v) Language games such as act and say the meaning of the word; add on, etc.
- (vi) Observation reports
- (vii) Poetry recitation

### III. EVALUATION

#### Testing Procedure

Besides the pretest, tests were given every fortnight, based on context learning, vocabulary, grammar, spelling, reading comprehension and speed.

#### The Measurement of Reading Speed

A passage was given to the boys and they were asked to read. While they read the investigator recorded time on the blackboard by writing figures i.e. 1 for 10 seconds, 2 for 20 seconds and so on. The pupils recorded the amount of time taken by them individually in the column assigned for the purpose.

#### Achievement Test Results

Table 1 given below shows the comparative statement of mean scores in subsequent six tests for both the control and the experimental groups.

Table 1  
MEAN SCORES

<i>Groups</i>	<i>Tests</i>					
	1	2	3	4	5	6
Experimental	55.17	57.05	64.29	70.18	74.06	67.48
Control	52.50	44.29	52.76	55.49	60.06	53.22
Mean Difference	+2.67	+12.76	+11.53	+14.69	+14.00	+14.26

# MEAN SCORES AND MEAN DIFFERENCES OF EXPERIMENTAL AND CONTROL GROUPS

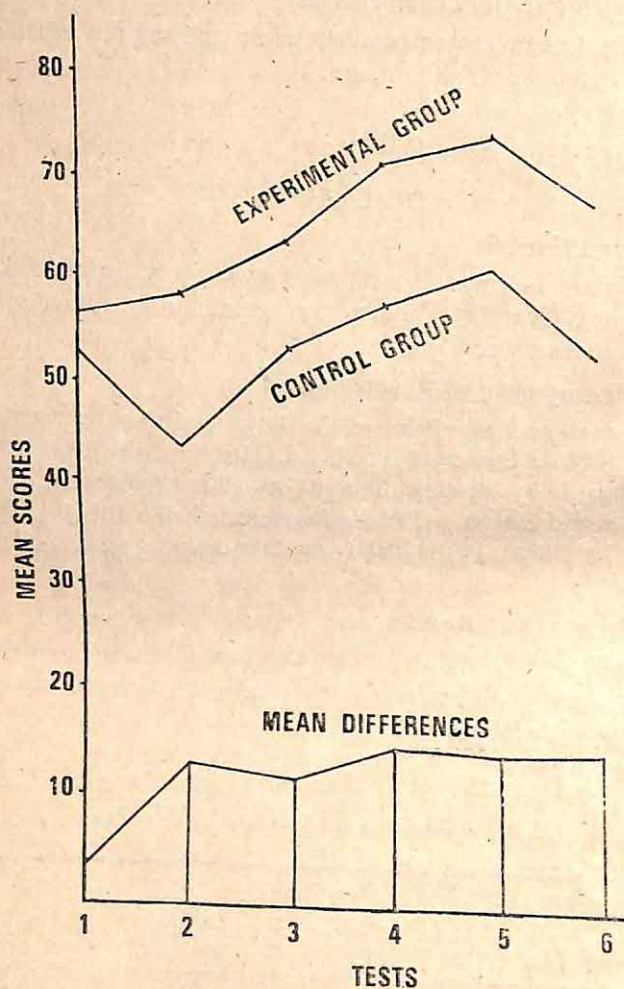


Table 2  
CRITICAL RATIOS AND THEIR LEVELS OF SIGNIFICANCE

Test	1	2	3	4	5	6
Critical Ratios	+ .567	+ 4.281	+ 3.285	+ 4.27	+ 5.109	+ 4.074
Levels of Significance	—	.01	.01	.01	.01	.01

Table 3  
MEAN SCORES ON READING COMPREHENSION TESTS

Groups	Tests					
	1	2	3	4	5	6
Experimental	6.422	5.553	6.660	6.66	7.733	6.489
Control	6.277	5.787	5.956	5.11	5.556	5.255
Mean Difference	+.145	-.234	+.704	+1.55	+2.177	+1.234

### READING COMPREHENSION TESTS

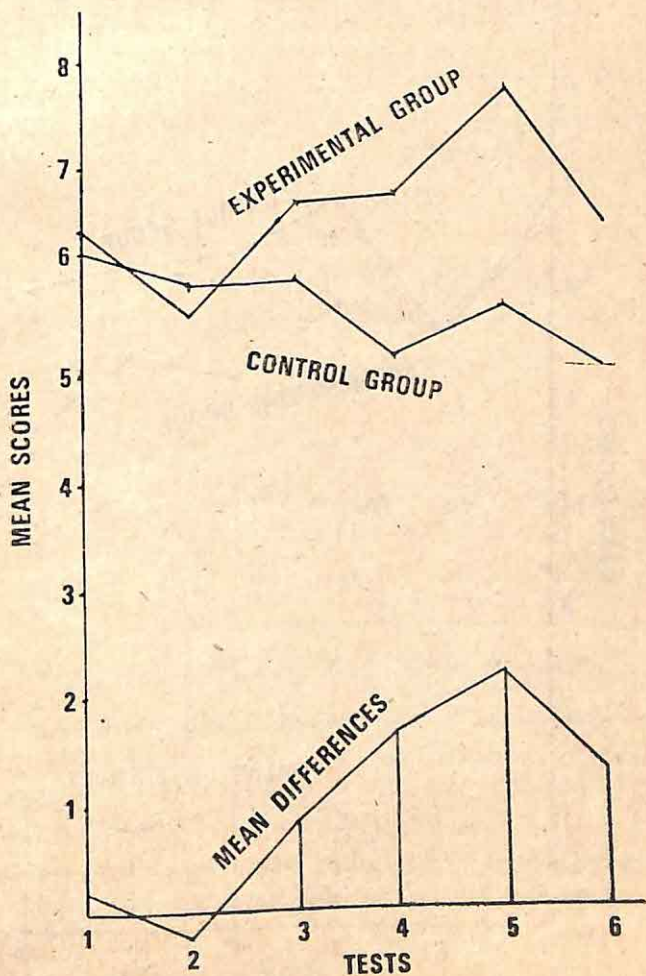




Table 4

CRITICAL RATIOS AND THEIR LEVELS OF SIGNIFICANCE

	<i>Tests</i>					
	1	2	3	4	5	6
Critical Ratio	+.418	-.561	+2.095	+5.516	+6.332	+4.019
Level of Significance	—	—	.05	.01	.01	.01

## READING SPEED TESTS

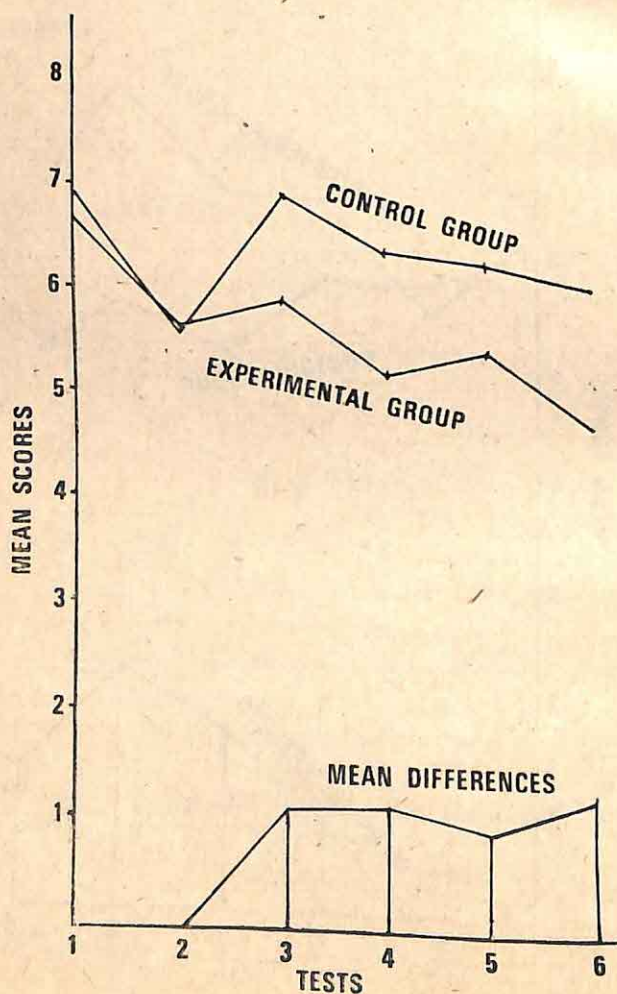


Table 5  
MEAN SCORES OF READING SPEED TESTS

<i>Groups</i>	<i>Tests</i>					
	1	2	3	4	5	6
Experimental	6.622	5.660	5.851	5.23	5.400	4.681
Control	6.667	5.638	6.935	6.41	6.378	6.021
Mean Difference	-.045	+0.022	-1.084	-1.18	-.978	-1.340

**Note :** The minus value shows better performance on the part of the experimental group since these results pertain to speed tests.

Table 6  
CRITICAL RATIOS AND LEVELS OF CONFIDENCE

	<i>Tests</i>					
	1	2	3	4	5	6
Critical Ratio	-.130	+.733	-3.366	-3.587	-3.444	-5.174
Level of Confidence	—	—	.01	.01	.01	.01

#### IV. INTERPRETATION OF THE RESULTS

In the early stages of the experiment no significant difference was visible. But later on the experimental group showed better performance. Besides fluctuations there was evident gain on the part of the experimental group.

In the reading comprehension tests no difference was found in the first two tests, but later on uniform progress of

the experimental group gained superiority over the control group.

## V. CONCLUSIONS

1. The data accrued tend strongly to support and substantiate the initially stated hypotheses. Teaching through activity method promotes the learning of the English grammar, spelling and vocabulary more than the conventional method does. It also helps in the learning of content material.

2. Reading comprehension is facilitated when English is taught through activity method.

3. Teaching through activity method also affects positively the reading speed of the learner.

## VI. MISCELLANEOUS

### **Difficulties Encountered during the Experiment**

1. It was difficult to adjust the time table for the purpose of the experiment.

2. There was lack of suitable books for the pupils.

### **Suggestions for Further Study**

1. The same experiment can be conducted for a longer period on a larger sample in English as well as other subjects.

2. The experimental design may be changed to rotation group method instead of parallel group method.

3. The construction of standardized tests in English for the four main skills—reading, writing, speech and comprehension is a pressing need for the research workers in the field of English teaching.

4. The effect of activity method of teaching of English on the attitude of pupils towards the subject can also be studied.

5. Standard teacher-guides for teaching of English through activity method may be prepared for different classes.

6. Comparative evaluation of the effectiveness of different curricular activities in the subject can be attempted.



## APPENDIX I

## SAMPLE ACHIEVEMENT TEST

## Part I—Comprehension Test

## Class IX

- Q. 1. Check the correct answer to the following questions from the poem 'Spring.'
- (i) In Spring the birds
    - a) fly away to different lands
    - b) sit quietly in their nests
    - c) please people with their singing
  - (ii) The shepherds
    - a) sit by the fire
    - b) sing joyful songs
    - c) gather wool for selling
  - (iii) The weather
    - a) is delightful
    - b) is very cold
- Q. 2. Name the shops where these things are sold.
- a) Pencil, writing paper, envelopes, notebooks
  - b) Cups, saucers, plates, jugs, earthenware
  - c) Aspro, iodine, balm, medicine, bandages
  - d) Sweets and chocolates
  - e) Comb, toilet soap, buttons, thread, scent, etc.
- Q. 3. Give the answer in one sentence only
- a) Why was the fisherman beaten ?
  - b) What kind of perfume was coming from the ring ?
  - c) Where can't we go whenever we like ?
  - d) Why did the king give the fisherman a reward ?
  - e) Why did the policemen call the fisherman their best friend ?
- Q. 4. Use any five of the following words in sentences of your own.
- Ancestors, pious, perfume, raw, dignified, release

## Part II—Reading Test

Time		
------	--	--

Read the following passage carefully and answer the questions given below.

Seeds are scattered in many ways. Birds help to carry the seeds with them in their feathers and drop them here and there. Some seeds roll when they fall. Others are carried from their homes by water. The down of the thistle, silkweed and dandelion seeds make little fluffy balloons. The wind takes these balloons on long journeys.

When a seed falls to the ground it lies as if it were dead as long as the earth is cold and dry. But when spring comes and the sun warms the earth, the little seed awakens.

1. Animals carry the seeds in their (a) feet (b) teeth (c) claws (d) feathers.
2. In spring the little seed (a) sleeps (b) awakens (c) dies (d) rots.
3. On the dandelion seed there is (a) silk (b) cotton (c) feathers (d) down.
4. The story says, the wind carries the seeds of the (a) cabbage (b) carrot (c) silkweed (d) raddish.
5. Some seeds are carried by (a) books (b) water (c) schools and (d) trees.
6. The story says the earth is warmed by the (a) sun (b) moon (c) stars (d) fire.
7. Birds help to carry (a) water (b) earth (c) balloons (d) seeds.
8. In how many ways are seeds scattered? (a) 3 (b) many (c) few (d) 9.
9. The down of the thistle looks like a fluffy (a) parrot (b) aeroplane (c) balloon (d) canary.

## APPENDIX II

## SOCIO-METRIC SCALE

Name.....

Class.....

*Instructions :*

- a) Answer the questions by filling in the blanks.  
b) Give three preferences in each case from *your own* class group.
1. With whom would you like to recite a poem in English ?  
(1) (2) (3)
  2. Whom will you choose as a partner while learning spelling ?  
(1) (2) (3)
  3. With whom would you like to exchange your test copy for correction ?  
(1) (2) (3)
  4. Whom would you like to take part in an English drama along with you ?  
(1) (2) (3)
  5. With whom would you like to do your home work in English ?  
(1) (2) (3)



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Project Report 4

DEVELOPMENT OF EFFECTIVE STUDY  
HABITS IN SCHOOL CHILDREN



V. G. BHASKARAN NAIR



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Chirakkadavu, P. O., Thekkethukavala  
KERALA  
1966-67

## ACKNOWLEDGEMENTS

The investigator acknowledges with thanks the assistance and guidance provided by Shri E.K. Zacharia, Co-ordinator, Extension Services Centre, St. Thomas' Training College, Palai and he is also thankful to the staff of the Chirakkadavu High School for the wholehearted co-operation they extended in carrying out the investigation.

## I. INTRODUCTION

### Need for the Study

The investigator had been working as headmaster of the school for the last ten years and has been experiencing difficulties in improving the examination results and general discipline of the school. In spite of the systematic and hard work done by the teachers and the active supervision by the investigator, the school could not produce the desired results. It was difficult to understand the reason for the poor performance of the children. Therefore the investigator held discussions with the members of the Staff Council about the poor performance of the children and they came to the conclusion that the pupils did not have effective study habits. Whatever study they did, it was done in a haphazard and in an unplanned manner. The teachers suggested that the investigator should find a way out and some new techniques should be introduced to inculcate effective study habits into the young minds of the pupils.

In the year 1965-66, the investigator got several opportunities to attend various conferences and seminars organised by the Extension Services Department, Palai, Kerala. This provided him an opportunity to know about certain good tested practices and techniques that were in vogue in other schools. Thus this investigator got the clue and decided to solve the problem by trying out a few techniques in his school with the active co-operation of the teaching staff. The investigator had discussion with the co-ordinator of the Extension Services Department. He suggested to me a project and asked me to send it for approval of the NCERT, New Delhi. Accordingly, the project was submitted which was approved and we immediately started working on it.



## Objectives

The objectives of this project were :

- (i) To enable children to plan their study programmes
- (ii) To encourage the children to use good reading materials
- (iii) To enable children to locate problems and try to find out solutions by using source materials
- (iv) To enable children to take classroom notes
- (v) To develop the habit of working independently and in groups and
- (vi) To inculcate the habit of silent reading

## Definition of the Terms Used

*Effective study habits* : Means doing studies with purpose and comprehension.

## II. PROCEDURE

Duration of the project was one year. 725 children were involved in the project.

*Extra time used* : One hour in the morning and one hour in the evening after school hours was used.

*Guardians' Conference* : As a first step towards the implementation of the project Guardians' Conference was held in which they were requested to keep a close watch on the progress of their wards.

*Staff Council* : At the beginning of every month a Staff Council meeting was held and teachers were given information about the progress of the project.

The Staff Council discussed the project and all the queries were answered by the investigator.

Pupils were given general instructions in the morning assemblies and official notices were displayed on the notice board to give further information regarding the scheme of work.

*Student Diaries* : To be sure that the children fully knew their assignments and completed them daily, a homework diary was introduced. Regular check-up of the diaries was also done by the concerned class teachers and occasionally by

the investigator. Pupils were instructed to prepare daily schedule of work. Sample cards were prepared by the class teachers and were given to children. Subsequent revisions were made in order to remove difficulties. The children were regularly encouraged to act according to the schedule planned by them. Random checking of the cards and diaries was also conducted by the investigator.

*Arrangements for Supply of Library Books :* The following arrangements were made for the regular supply of library books. Every class had a committee consisting of the class teacher as the chairman, the class leader as the secretary and the deputy class leader as the member. The class teacher provided good reading materials to the concerned class and the class leader distributed the books to children. The deputy leader assisted the class leader in distributing books, collecting them back and maintaining proper records.

*Reading Room :* As there was no special reading room every class room was converted into a reading room. Every class subscribed one or two newspapers. Expenditure towards the payment of subscription was met by the class concerned. The class leader and the deputy leader were in charge of the safe custody and maintenance of the newspapers and weeklies. Weeklies and magazines were supplied to classes by the school to the extent the school fund permitted. Free copies of magazines and weeklies made available to the school by the various agencies were also placed at the disposal of the class leaders.

*Use of Reference Material :* Children were given training in the use of source materials especially dictionaries. Dictionaries were taken to the classes and how these could be used was explained to the children. Some children were asked to find out the meanings of certain words in the presence of the teacher concerned. Children were also encouraged to purchase pocket editions of dictionaries. Dictionaries were purchased in bulk and were distributed to children on cost price.

All teachers gave information about source materials and reference books during their classes. Teachers made a genuine attempt in creating interest in children for books and newspapers. Teachers supervised to know whether pupils



were making use of the books issued to them by checking their library diaries.

*Book Review* : Children were also given training in writing book reviews. Certain reviews were read out in the open class and the defects if any were pointed out by the teacher. Good reviews were commended and some of them were published in children's manuscript magazines. Children were also told about catalogues and their use. Display of catalogues and reference books was arranged in every classroom.

*Talks* : Talks were given to pupils regarding good reading habits. Model reading was given by specially selected teachers. They used to recite the poems melodiously and thus created an interest for poetry.

Training in silent reading was also imparted. Children who came early to the school were instructed to remain in the class and read silently. Even during leisure time children used to read silently.

Talks were also given in each class on how to take class notes. Pupils used to take down notes while the teacher was teaching. Formerly they did it carelessly and made many mistakes. When the teacher began to check up their note-books, they made lesser mistakes. Moreover they began to maintain note-books and text books neatly.

Teachers also gave regular talks in the morning assemblies on selected subjects such as 'How to read silently', 'How to write a book review', 'How to spend leisure hours', etc. Children who showed outstanding merits were encouraged and were introduced to all in the morning assembly.

*Group Work* : Group work in various subjects was encouraged. Each class was divided into different groups consisting of six children. Every group had a group leader who was brilliant especially in mathematics. The group leader acted as a tutor. The pupils freely consulted their group leader. Whenever he had any difficulty he approached the mathematics teacher and sought his assistance. After having cleared his doubts, he would clear the doubts of his friends in his group. Debates and discussions were organised and students were encouraged to participate in it.



### III. EVALUATION

Many of the achievements of the children could not be measured in statistical terms. Hence other tools of evaluation were used such as interviews, observations, etc. Examination result was also taken into consideration in assessing the achievements of the children. Since the children had evinced a great interest in purchasing the dictionaries, the investigator feels that the children had cultivated a habit of using source material or reference books.

Class notes taken down during the period of the project had shown a definite improvement when compared with the notes taken down during the pre-project period.

As some of the students had written very good book reviews it was understood, that students read the books with purpose and comprehension.

Daily routine cards prepared by the pupils clearly showed that they knew the art of planning their study programmes.

Their library diary was an evidence of their keen interest in reading good reading materials.

The observation made during the reading periods proved that the pupils fully knew the importance of silent reading.

There was also an improvement in the annual examination results. There was an increase of 6% in the results of the annual examination of 1966-67 of standards VIII and IX. The investigator felt that this increase in the results was due to the extra reading done properly by the students during the period.

### IV. CONCLUSION

The investigator feels that the activities conducted in the school to develop effective study habits in school children have been very helpful in achieving the stated objectives.

### V. MISCELLANEOUS

#### **Difficulties Experienced**

Due to financial difficulties as stated in the project, cumulative records, routine cards and questionnaires could not be got printed.

Since the teacher had to supervise all the activities of the

pupils and had to remain in the school till 5'O clock everyday, the teachers' workload had increased considerably.

Guardians when invited came to attend the conference with great reluctance and only very few guardians showed any interest in the programme.

The school had a number of activities to be conducted after 4'O clock and as such the programme of this project interfered with the regular school programme.

The school had no special librarian. A teacher who was put in charge of the library had to do a lot of extra work besides his daily school work. So the need for a full time librarian was felt and the absence caused some difficulties.

### **Follow-up Programme**

The project was found useful for inculcation of effective study habits in school children. So the investigator feels that the difficulties should be overcome and the project should be put in operation as a regular practice of the school in future. For this the following steps will be taken. Attempts will be made to overcome the financial difficulties with the assistance of the school management.

Guardians' co-operation will be sought by contacting them personally through home visits or by inviting them individually to the school.

The teacher in-charge of the school library will be assisted by two or more of his colleagues to meet the need of a full-time librarian partially.

These programmes will not be allowed to interfere with the other school programmes. Both will be integrated and will find a place in the regular programme of school work.

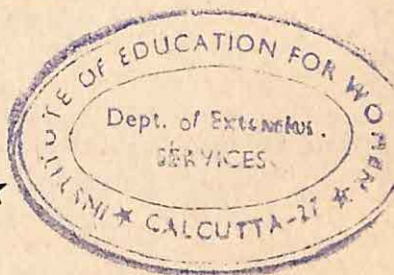
The investigator feels that by overcoming these difficulties, the project when implemented again will produce still better results.



PREPARATION OF INSTRUCTIONAL  
MATERIAL FOR TEACHING  
COMPOSITE MATHEMATICS  
IN STANDARD X



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## ACKNOWLEDGEMENTS

I am grateful to A. Narayana Reddiar, Principal, Shri K. Pitehaimuthu, Lecturer and Coordinator, Extension Services Department and Shri S. Soundararajan, Lecturer in Mathematics, Thiagrajar College of Preceptors, Madurai for their able guidance.

In the last but not the least I thank the teachers and pupils of our school for their unstinted cooperation in conducting the project.

## I. INTRODUCTION

### Need for the Study

This school realised that some of the pupils who opted for composite mathematics were extremely weak in the subject. Composite mathematics was thought of by them almost as a bugbear. They even developed a sort of hatred towards the subject. This attitude of the pupils was evident in their dislike for home assignments and carelessness in their performance in the tests and examinations.

The main reason for this was considered to be the pupils' weakness in the mathematical concepts. The mathematics teachers thought of a way that would make the comprehension of mathematics easier and create an interest in pupils for learning the subject. It was felt that the instructional material may be prepared and used in the class-room teaching which will be far more effective than the usual 'chalk and talk' method.

The school, therefore, thought of launching a project in two phases, the first phase covering a period of one year to prepare instructional material in composite mathematics for standard X and the second phase covering another period of one academic year to try out these instructional materials in the class so as to determine the validity of these materials and to ascertain how far they are useful and effective in developing the right mathematical concepts in pupils.

In the year 1966-67, the investigators tried to prepare the instructional materials. Their plan is to launch another project to try out the materials during the next year.

### Purpose of the Study

The purpose of the study, as far as the first phase is concerned, is to prepare the instructional materials in composite



mathematics for standard X with the help of the pupils of the same standard.

### **Delimitations**

(i) The preparation of the material was limited to the syllabus for standard X.

(ii) The material was prepared on certain selected topics in which pupils normally commit mistakes and feel difficulty in grasping the concepts.

## **II. PROCEDURE**

### **Formation of Committee**

First of all a committee was formed with the Headmaster as the convener. The committee consisted of all the senior mathematics teachers, the craft instructor, the drawing master and a pupil representative. The committee met frequently as and when the need arose. Details of the budget were worked out by this Committee for the grant sanctioned by the NCERT.

### **Choice of the Area**

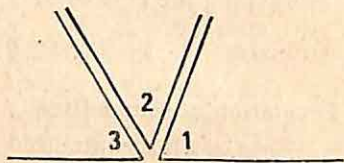
The entire portion of the syllabus in composite mathematics for standard X could not be covered in a period of one year due to limitations of funds and tools at the disposal. So a selection of suitable topics was made which were grouped out with a view to divide them into topics for models, for charts and for slides.

This was an important part of the project requiring careful consideration. The topics that were normally thought to be difficult for the pupils were chosen. Teachers' classroom experience, pupils' homework notebooks and their performance in the tests and examinations formed the main criterion to choose such topics.

### **Division of the Area**

The topics so chosen were divided further. Some of them required wooden models. Some required charts and some required slides. Besides, some difficult topics required more than one type of aids. So the committee carefully analysed each and every topic and divided them into proper groups.

For example, (i) The cube was grouped in the plywood model group. Cube being a three dimensional object, drawing a cube on the black board, painting it as a chart or preparing it on a slide have only a two dimensional effect which is not sufficient for developing a right concept of a cube (ii) the theorem that the sum of the three angles of a triangle is  $180^\circ$  could be well understood by the pupils only when they actually placed the three angles of a triangle side by side to form a straight line ( $180^\circ$ ) as given in the nearby figure. So, a chart first showing a triangle with different colours and then showing all the three angles (with the same colours as in the previous figure adjacent to each other forming a total of  $180^\circ$  was prepared. Also three pieces of cardboards containing the above angles with the same colours were prepared so as to apply them on the figures in the chart.



An important point was explained here that three charts were prepared to show that it is true in the case of all the three types of triangles—acute, obtuse and right-angled. For theorems involving triangles, any triangle was chosen at random and generalisation was aimed at (iii) the identity  $(a+b)^2 = a^2 + b^2 + 2ab$ , which was not clearly understood by many pupils. They were not able to differentiate between  $(a+b)^2$  and  $a^2 + b^2$ . The necessity for the term  $2ab$  on the right side in the identity should be insisted.

In order to prove this identity, not only a chart was prepared but plywood cubes were also prepared and painted with different colours on each face of every cube so that by arranging them properly the identity could be easily understood by the pupils. Appendices I, II and III contain information about models and charts.

### Grouping

The class consisted of 32 pupils. It was essential to split the class into four groups—one each for four types of work—namely, painting charts, preparing slides, making hard board



models and carving wooden models. These were made according to the taste of the pupils. They were given the option to join any one of these groups. Some pupils who wanted to do more than one type of work were also given chance to finish one and then to take up another.

### Activity

This being a project to be covered in a year, it was necessary to avail most of the holidays and the out of school hours on working days. Each group sat independently and did the work allotted to it. All the aids were prepared by the pupils themselves with the guidance of their teachers.

### III. PRESENTATION AND ANALYSIS OF DATA

After preparing the instructional aids, the committee met and inspected all the aids that were prepared. Some aids which were not found up to mark were prepared again. Others which were not very appealing were prepared in another way. Thus revision of aids was done then and there.

### IV. CONCLUSION

The completed portion of the project being only the preparation of instructional aids, the real conclusion can be arrived at only after putting these to use and testing them experimentally. Second part will be taken up next year.



## APPENDIX I

## Hard Board Models

1. A cube
2. A rectangular slab
3. An equilateral triangled prism
4. A cone
5. A cylinder
6. A pyramid
7. A hexagonal prism

## APPENDIX II

## List of Charts

## A. Algebra

- 1) To prove geometrically  $(x+a)(x+b)=x^2+x(a+b)+ab$
- 2) To prove geometrically  $(x+y)^2=x^2+2xy+y^2$
- 3) To prove geometrically  $(a-b)^2=a^2-2ab+b^2$
- 4) To prove geometrically  $(a+b)(a-b)=a^2-b^2$
- 5) To prove geometrically  $(a+b)^2+(a-b)^2=2(a^2+b^2)$
- 6) To prove geometrically  $(a+b)^2+(a-b)^2=2(a^2+b^2)$   
(Different size)
- 7) To prove geometrically  $(a+b)^2-(a-b)^2=4ab$
- 8) To prove geometrically  $(x+y+z)^2=x^2+y^2+z^2+2xy+2yz+2zx$

## B. Theoretical Geometry

- 9) If two straight lines intersect, the vertically opposite angles are equal.
- 10) The sum of the angles of a triangle is equal to two right angles.
- 11) If a side of a triangle is produced, the external angle formed is equal to the sum of the internal opposite angles.
- 12) The sum of the external angles of a triangle is equal to  $360^\circ$ .
- 13) Straight lines which are parallel to the same straight line are parallel to one another.

- 14) If a straight line cuts two parallel straight lines then the interior angles on the same side of the cutting line are supplementary.
- 15) The angles of an equilateral triangle are equal to one another.
- 16) The median drawn from the base of an isosceles triangle bisects the angle at the vertex.
- 17) The bisector of the angle at the vertex of an isosceles triangle is the perpendicular bisector to the base.
- 18) In an isosceles triangle the angles opposite to the equal sides are equal.
- 19) If two triangles have two sides of the one respectively equal to two sides of the other and the included angle of the one equal to the included angle of the other, the triangles are congruent.
- 20) If two triangles have two angles of the one equal to the two angles of the other each to each and also one side of the one equal to the corresponding side of the other, the triangles are congruent.
- 21) If two triangles have three sides of the one equal to three sides of the other each to each the triangles are congruent.
- 22) If two right angled triangles have their hypotenuses equal and one side of the one equal to one side of the other, the triangles are congruent.
- 23) The area of a triangle is equal to half the area of the parallelogram on the same base and between the same parallels.
- 24) The area of a triangle is equal to half the area of the rectangle on the same base and between the same parallels.
- 25) If a parallelogram and a rectangle have the same base and lie between the same parallels, they are equal in area.
- 26) The external angles of a regular polygon are equal.
- 27) The sum of the external angles of a polygon is equal to  $360^\circ$ .



- 28) The sum of one internal and one adjacent external angle is equal to  $180^\circ$ .
- 29) If the sides of a polygon are produced in order, then the sum of the external angles so formed is equal to  $360^\circ$ .
- 30) Pythagoras' Theorem—Proof I
- 31) Pythagoras' Theorem—Proof II
- 32) The locus of a point which is equidistant from two fixed points is the perpendicular bisector of the line joining the two points.
- 33) The sum of the angles formed by several straight lines, meeting at a point is equal to four right angles.
- 34) The area of a circle
- 35) To find the area of the empty space when four coins of same diameter (say 14cm) are placed so as one touching the other two.
- 36) A circular ring
- 37) Major and minor sectors.
- 38) In  $\triangle ABC$ , BC is produced to D. The bisectors of  $\angle ACD$  and  $\angle B$  meet at P. Prove that  $\angle P = \frac{1}{2} \angle A$ .
- 39) In  $\triangle ABC$ , AB and AC are produced to X and Y respectively. Bisectors of  $\angle XBC$  and  $\angle YCB$  meet at O. Prove that  $\angle BOC = 90^\circ - \frac{1}{2} \angle A$ .
- 40) In  $\triangle ABC$ , the bisectors of  $\angle ABC$  and  $\angle ACB$  meet at O. Prove that  $\angle BOC = 90^\circ - \frac{1}{2} \angle A$ .
- 41)  $AB \parallel CD$ . A straight line EF cuts them at G and H. Bisectors of  $\angle HGB$  and  $\angle GHD$  meet at 'O'. Prove that  $\angle GOH = 90^\circ$ .
- 42) A diagonal of a parallelogram divides it into two triangles of equal area.
- 43) In parallelogram ABCD, E and F are the mid-points of AB, CD respectively. Prove that parallelogram AFCE =  $\frac{1}{2}$  parallelogram ABCD.
- 44) In  $\triangle ABC$ , D and E are the mid-points of AB and AC respectively. BC is produced to F. Prove that  $\angle DEC = \angle ACF$ .



- 45) The area of a trapezium
- 46) The sum of the areas of the squares on the four sides of a rhombus is equal to the sum of the areas of the squares on its diagonals.
- 47) The opposite angles of a quadrilateral formed by the bisectors of the angles of the quadrilateral are supplementary.
- 48) In quadrilateral ABCD the bisectors of  $\angle B$  and  $\angle C$  meet at 'O'. Prove that  $\angle BOC = \frac{1}{2}(\angle A + \angle D)$ .
- 49) In equal circles if two chords are equal, they cut off equal areas.
- 50) In equal circles, equal arcs subtend equal angles at the centre and its converse.
- 51) The angle which an arc of a circle subtends at the centre is double that which it subtends at any point on the remaining part of the circumference.
- 52) Angles in the same segment of a circle are equal.
- 53) The angle in a minor segment is obtuse.
- 54) The angle in a semi-circle is a right angle.
- 55) The angle in a major segment is acute.
- 56) The opposite angles of a cyclic quadrilateral are supplementary.
- 57) If one side of a cyclic quadrilateral is produced, the exterior angle is equal to the interior opposite angle of the quadrilateral.
- 58) If two chords of a circle intersect inside the circle, the rectangle contained by the segment of the one is equal to the rectangle contained by the segment of the other.
- 59) If from any point outside a circle, a chord and a tangent are drawn, the rectangle contained by the segments of the chord is equal to the square on the tangent.
- 60) The locus of the middle points of the chords of a circle, passing through a given point, is the circumference of a circle. Its diameter is the straight line

joining the given point and the centre of the given circle.

- 61) 'O' is the ortho-centre of the triangle ABC. Prove that  $\angle BOC - \angle BAC = 180^\circ$ .
- 62) In the cyclic quadrilateral ABCD, AB and DC are produced to meet at F; AD and BC are produced to meet at E. Prove that  $\angle E + \angle F + 2\angle A = 180^\circ$ .
- 63) The pedal Triangle.
- 64) The locus of the middle points of chords of equal length in a circle is the circumference of a circle, whose centre is the centre of the first circle, its radius being the line joining the middle point of any one of the chords and the centre.
- 65) Equal circles cut at P and Q. A straight line RS passes through Q. Prove that  $\angle PRQ = \angle PSQ$ .
- 66) D is a point on the circumference of the circumcircle of the  $\triangle ABC$ . Prove that  $\angle A = 90^\circ - \angle D/2$ .
- 67) The sum of the angles of a quadrilateral is equal to  $360^\circ$ .
- 68) Segments.
- 69) The square root in spiral form.

## APPENDIX III

### Plywood Models

- 1) The straight lines joining the middle points of a rhombus form a rectangle.
- 2) If equilateral triangles are drawn externally on the three sides of a triangle, then the excircles of the equilateral triangles will pass through a common point.
- 3) The angle which an arc of a circle subtends at the centre is double that, which it subtends at any point on the remaining part of the circumference.
- 4) Appolonius Theorem.
- 5) Three circles are drawn, one touching the remaining two externally. The excircle of the triangle ABC is the in-circle of the triangle PQR; P,Q,R, being the centres of the circles.
- 6) The diagonals of a square are perpendicular bisectors to each other.
- 7) The locus of a circle moving with its circumference touching the arms of an angle, is the bisector of the angle.
- 8) In triangle ABC,  $AD \perp BC$ ,  $BE \perp AC$ . Prove that ODCE is a cyclic quadrilateral.
- 9) Finding the area of a rhombus.
- 10) Drawing the ex-circle of a triangle.
- 11) The lines joining the middle points of a rectangle form a rhombus.
- 12) The angle between a tangent to a circle and the chord through the point of contact is equal to any angle in the alternate segment.



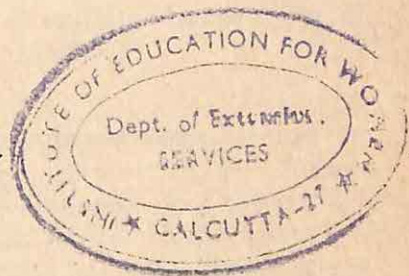
- 13) The orthocentre of an acute-angled triangle lies inside the triangle.
- 14) In an equilateral triangle the sum of the areas of the square on the three sides is equal to four times of the area of the squares of the median.
- 15) Angles in the same segment are equal.
- 16) The angle which an arc of circle subtends at the centre is double that which it subtends at any point on the remaining part of the circumference.
- 17) The straight lines joining the middle points of an isosceles trapezium form a rhombus.
- 18) The straight lines joining the middle points of a quadrilateral form a parallelogram.
- 19) The bisectors of equal angles of an isosceles triangle form another isosceles triangle.
- 20) The straight lines joining the middle points of a square form a square.
- 21) Two triangles equal in areas stand on opposite side and have the same base, then the straight line joining the vertices of the two triangles is bisected by the base.
- 22) Extension of the theorem of Pythagoras to an acute-angled triangle.
- 23) Pythagoras Theorem.
- 24) A regular hexagon.
- 25) Tangents, Common tangents, Direct Common tangents, Transverse Common tangents and concentric circles.
- 26) a) The distance between the centres of two circles touching externally.  
b) Concentric circles.
- 27) The distance between the centres of two circles touching externally.
- 28) Drawing the in-circle of a triangle.
- 29) The ortho-centre of an obtuse-angled triangle lies outside the triangle.

- 30) The diagonals of a rhombus are perpendicular bisectors to each other.
- 31) The in-circle and the ex-circle of a triangle.
- 32) The ortho-centre of an acute-angled triangle lies inside the circle.
- 33) In triangle ABC  $\angle BAC = 90^\circ$ .  $AD \perp BC$ .  
Then  $AD^2 = BD \cdot DC$
- 34) Extension of the theorem of Pythagoras to an obtuse-angled triangle.
- 35) The ortho-centre of a right-angled triangle is the vertex of the right angle.
- 36) A rectangle and its properties.
- 37) The locus of the centre of a circle of given radius touching another fixed circle externally, is another concentric circle whose radius is equal to the sum of radii of the two given circles.
- 38) The above four circles touching internally.
- 39) For an equilateral triangle, the ex-centre and the in-centre are one and the same point.
- 40) The locus of the centre of the given circle touching the given point in the circumference of a given circle is the line or the line produced joining the given point and the centre of the given circle.
- 41) A rider relating to two circles touching externally.
- 42) In triangle ABC, AB and AC are produced to X and Y respectively. BI and CI, are the bisectors of  $\angle XBC$  and  $\angle YCB$  and they meet at I. Prove that ACIB is a cyclic quadrilateral.
- 43) ABC is an isosceles triangle inscribed in a circle. The chords AF and AG cut at D and E respectively. Prove that DEGF is a cyclic quadrilateral.
- 44) Construction of a rectangle of equal area of a given triangle with the same base.
- 45) In triangle ABC,  $AD \perp BC$ . E, F and G are the middle points of BC, CA and AB, respectively. Prove that EDFG is a cyclic quadrilateral.
- 46) A graduated klinometer.

TRYING OUT THE EFFICACY OF THE  
TRADITIONAL METHOD OF, AND STRUC-  
TURAL APPROACH TO THE TEACHING OF  
ENGLISH IN THE FOUR LANGUAGE SKILLS



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## ACKNOWLEDGEMENTS

The investigator is thankful to the Principal of the Institution for rendering necessary help to the investigator in executing the project.

His thanks are also due to his colleague Shri S.N.Sarma, an Asstt. Teacher who took the responsibility of teaching English through the translation method and co-operated sincerely in executing the project.

## I. INTRODUCTION

### **Need**

True it is, that after India's independence, the learning of English as a foreign language has lost much of its importance. It no longer occupies the same honoured place as it did during the British rule. Even if we admit this, many Indian educationists, scholars and politicians are of the opinion that, as English is an international language and as some of our regional languages have not yet fully developed, and have not attained the same level as English does, specially in the field of medicine and technology, Indian students should learn English at least for a few years to come. An abrupt change or switch over from English to any regional language will bring some dislocation in different fields of education. Hence English is to be taught, and it is felt that it must be taught well.

It is a fact that the standard of teaching and learning English in secondary schools of Assam has gone down and the investigator's school is not an exception to this. In order to remove this weakness, it was considered that the present project may be taken up to test the efficacy of teaching English by traditional method and by structural approach.

### **Historical Background**

The investigator had an opportunity of going through the books written by some eminent educationists like Palmer, Menon and Patel where they have expressed their opinions that teaching a foreign language like English through structural approach to pupils whose mother tongue is not that language gives better results. Hence the investigator, as a teacher of English, was very much inclined to test this statement in his school.

### **Purpose of the Study**

The main purpose of the project was to test the efficacy of

the two methods (translation method and structural approach) of teaching English.

The other objectives of the project were to develop in pupils the four language skills, viz.

- i) To understand English when spoken
- ii) To speak English
- iii) To read English
- iv) To write English.

## II. PROCEDURE

There were 88 pupils in class IV. The pupils were divided into two groups, that is, section A and section B, as per results of the admission test for class IV. The investigator took care to see that the two groups contained equal number, as far as practicable, of bright, average and below average pupils. Section A was called the experimental group and it had 45 students and section B was termed as control group which had 43 pupils. The investigator took up the experimental group to teach while another English teacher was put incharge of the control group.

Making allowances for holidays and half holidays, there were only 140 working days. Time allotted was eight periods of 40 minutes each a week. The working days were divided into three terms:—

1st Term	From January to June—working days were 70.
2nd Term	From July to September—working days were 30.
3rd Term	From October to December—working days were 40.

In order to carry on the project, the investigator had a preliminary talk with the Principal as to how the project could be executed. He had to study a few reference books and other educational journals available in the school. The librarian also helped him by supplying necessary books from the school library. He had also an informal talk with the pupils to know



their socio-economic background and the locality of the schools where they had come from.

Models, toys, alphabet chart, charts on sentence patterns, coloured chalk, text book and other common teaching aids were the materials used throughout the project by the investigator.

In the experimental group, that is, in Section A, the following procedure was used.

### **Oral Work**

*Stage I* At this stage, pupils were taught the names of the common objects they use in their school and the objects they see in their class room, first in phrases, then in sentence patterns. In order to make clear conception and consolidation of things taught, enough drill work was given to pupils. The first twelve sentence patterns (from Menon and Patel's book were also taught at this stage.

*Stage II* At this stage, pupils were taught the names of objects they see or use at home. Commands were also given at this stage. Sentence patterns from No. 13 to 24 (as given in Menon and Patel's book) were taught at this stage.

*Stage III* After laying the basic foundation, the investigator followed the regular course of Standard Readers No. 1, one of the prescribed text books for class IV. While following the text books demonstration of new words and phrases in sentence pattern by the investigator first and then drilling of those very words and phrases by pupils was a regular feature in imparting new knowledge to pupils.

On each lesson, the investigator used to put objective based questions and the pupils were to answer those questions in short sentences. If the pupils failed to give short and pointed answers, the investigator was always there to help them. Charts prepared on sentence patterns were fully utilized at this stage and the students had enough drilling in these patterns.

### **Reading**

Reading was taken up two months after the oral work had been started. While teaching reading, care was taken for

correct pronunciation with intonation. After giving model reading by the investigator, pupils were asked to read. In developing reading skills good readers were always asked to read first. Bad and shy readers were occasionally asked to read in groups. In order to test whether pupils could read with comprehension, short questions were put to them on the contents of the lesson taught.

### Writing

While the investigator was endeavouring to develop the writing skill in pupils, he took necessary precautions that the pupils did not confuse the four types of letters of the English alphabet. To develop the writing habit of the pupils, the investigator assigned regular home work on scripts for a few months.

### Grammar

As there was no prescribed text book for grammar, the investigator did not teach grammar in a formal way. However, while teaching the lesson of the text books, he gave the pupils a general idea of the parts of speech inductively. Conjugation of important verbs of everyday use like 'to go', 'to jump', to run, to laugh, to dance, 'to sing' were taught through 'Activity Method' in different tenses. All the sixty structures meant for the first year were taught at this stage.

### Spelling

In teaching the spelling of new words, the investigator demonstrated the object first, then he wrote down the name of the object on the black board. Next the investigator rubbed the name away from the blackboard and pointing out the object to a pupil asked him to name it. Then he asked the pupils either to spell the word he named or to write it down on the black board. As some pupils learn spelling of a word by hearing, some by seeing and some by writing the word, the investigator applied all the techniques.

In class IV Section B, which was a control group, Translation Method was applied in all the stages.



## III. PRESENTATION AND ANALYSIS OF THE DATA

## Data Collected

In order to make assesment of the progress of work done in both the sections, the investigator held three types of examinations, viz., monthly, terminal and annual. In the monthly examination, assessment was made by oral and written tests held in the class. The terminal examination was held after the completion of the work of the 1st term ending in June. The course covered the progress of work made in the 1st term. The Annual Examination was held in December, that is, at the end of the academic session. The assessment was done for the whole course covered during the academic year.

The charts showing scores and frequency of the experimental and control groups in three different examinations are given in the following tables :

TABLE 1  
MONTHLY ASSESSMENT

<i>Experimental Group</i> (Section A)		<i>Control Group</i> (Section B)	
<i>Scores</i>	<i>Frequency</i>	<i>Scores</i>	<i>Frequency</i>
0-9	2	0-9	2
10-19	3	10-19	12
20-29	10	20-29	7
30-39	10	30-39	6
40-49	6	40-49	10
50-59	7	50-59	4
60-69	5	60-69	2
70-79	2	70-79	x
80-89	x	80-89	x
90-99	x	90-99	x

Total no. of students=45

Total no. of students=43



TABLE 2  
 TERMINAL ASSESSMENT

<i>Experimental Group (Section A)</i>		<i>Control Group (Section B)</i>	
<i>Scores</i>	<i>Frequency</i>	<i>Scores</i>	<i>Frequency</i>
0-9	x	0-9	x
10-19	x	10-19	4
20-29	2	20-29	7
30-39	1	30-39	7
40-49	9	40-49	9
50-59	9	50-59	5
60-69	11	60-69	9
70-79	8	70-79	1
80-89	4	80-89	x
90-99	1	90-99	x
Total no. of students=45		Total no. of students=42	

TABLE 3  
 ANNUAL ASSESSMENT

<i>Experimental Group (Section A)</i>		<i>Control Group (Section B)</i>	
<i>Scores</i>	<i>Frequency</i>	<i>Scores</i>	<i>Frequency</i>
0-9	x	0-9	x
10-19	x	10-19	x
20-29	x	20-29	1
30-39	1	30-39	2
40-49	4	40-49	7
50-59	13	50-59	9
60-69	8	60-69	13
70-79	9	70-79	4
80-89	9	80-89	4
90-99	1	90-99	x
Total no. of students=45		Total no. of students=40	

TABLE 4

## MEANS OF SCORES OF THE EXPERIMENTAL GROUP—SECTION A

<i>Assessment</i>	<i>Mean</i>
Monthly Assessment	38.3
Terminal Assessment	60.2
Annual Assessment	66.0

## MEANS OF SCORES OF THE CONTROL GROUP—SECTION B

<i>Assessment</i>	<i>Mean</i>
Monthly Assessment	31.2
Terminal Assessment	42.6
Annual Assessment	56.8

The above tables indicate that the results of the experimental group are better than those of the control group. It was also observed that pupils of the experimental group were found more prompt and smart than their counterparts who were found generally shy and slow in response.

**Interpretation**

It was observed that pupils coming from rural areas which were socially and economically backward generally needed more care and attention in teaching than their other classmates hailing from urban areas and educated families.

**IV. CONCLUSIONS**

A comparative study of the scores and frequency tables of the experimental and control groups indicated that the mean scores of the experimental group were higher than those of the control group. Hence it was concluded that the structural approach to teaching English is superior to the traditional or translation method.

While following the structural approach to teaching English, the teacher should keep in view the following points :



- (i) Emphasis be laid on the oral aspect of English.
- (ii) Mother tongue should be used on rare occasions when all other techniques fail.
- (iii) The unit of expression should be a sentence.
- (iv) All available teaching aids and tools be utilized.
- (v) Learning should be preceded by demonstration and drilling.
- (vi) Audio-visual aids should be used as far as practicable.
- (vii) If Grammar is taught, it should be taught by inductive method.
- (viii) The sentence patterns should be taught systematically during the 1st year.
- (ix) Too many difficulties should not be presented at a time.
- (x) Due emphasis should be given to fluent speech, good pronunciation and correct spelling.

#### V. FOLLOW-UP

(i) As the findings of the experimental project revealed that the teaching of English through structural approach gave better results, this method would be continued in teaching English in next higher classes, that is in classes V and VI.

(ii) The investigator would invite all the English teachers of his school as well as those of the neighbouring schools to have a group discussion about the findings of his experimental project. If they are convinced regarding the findings of the project, a programme would be chalked out for teaching English through structural approach in other schools also. Regarding teaching English through structural process in the investigator's own school, we would request the other English teachers to try out this approach in their own classes.



PERIODICAL EXAMINATIONS IN  
PLACE OF ANNUAL EXAMINATIONS  
IN CLASSES VI AND VII



TARLOK SINGH



Govt. High School, Bishnah  
Jammu, J & K  
1967-68

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## ACKNOWLEDGEMENTS

The investigator expresses his gratitude to Sarvashri Ishwar Sharma, Dy. Director of Education, Jammu; S. Mohinder Singh Principal and Hony. Director, Extension Services Department, T.T. College, Jammu; B.N. Gupta, District Inspector of Schools, Jammu and Shri Hukam Chand Rattanpal, Coordinator, Extension Services Department, T. T. College, Jammu for their valuable help and guidance.

## I. INTRODUCTION

### Need for the Study

Since students are now promoted to the next higher classes on the basis of their performance in the annual examination, they are not regular and systematic in their studies. It is generally observed that most of the students remain indifferent to their studies for a major part of the year and acquire necessary information and techniques to get through the examination only within a few months before the commencement of the examinations. Students attach no importance to half-yearly examinations simply because no weightage is given to such examinations at the time of annual promotions. Thus there is a wastage of time, energy and resources. The investigator, therefore, thought of a project to introduce periodical examinations in place of annual examinations.

### Hypothesis

Periodical tests will inculcate among students the habits of regularity and systematic studies and will improve the examination results.

### Delimitation of the Study

- (i) The experiment was conducted in class VI in 1965-66 and it was extended to class VII in 1966-67.
- (ii) In 1967-68 it was extended to class VIII with the intention to institutionalize it within a period of five years.

## II. PROCEDURE

The Project was taken in hand in the beginning of the academic session 1966-67 in 6th and 7th classes. It was decided to conduct first, second and third quarterly examinations in the months of July, November and March, 1967 respectively. The entire syllabus was divided in such a way as to be covered in three terms.



In the first term the paper setters and examiners in all the subjects were the teachers teaching the subjects to the class. The students were examined in one third of the course. Viva voce in English and mental arithmetic were introduced which were new items of tests for the students. The second term examination was held in the last week of November 1966. Fifty per cent questions were set so as to cover the course completed during the first term and remaining 50% questions were set from the course covered during the second term. Answer books during the second term were marked by two teachers, one of these two being the concerned subject teacher. The third term examination was held in March 1967. Questions were set covering the whole course completed during the year as follows :—

- (a) 25% of the questions were asked from the course covered in the first term.
- (b) 25% of the questions covered the course taught during the second term.
- (c) Remaining 50% questions were set from the course covered during the third term.

Paper-setters and examiners of various subjects were other than those directly concerned with the class. Progress reports of the students' academic attainments, discipline, games and behaviour in general were sent to the parents after the termination of each term.

### III. PRESENTATION AND ANALYSIS OF DATA

Marks obtained by a particular student in all the periodical tests were tabulated at one place in the result register as shown in Table 1.

TABLE 1

Roll No. and Name of Student :

Term	Eng.	Math.	Social Studies	Urdu/ Hindi Pbi.	Gen. Sc.	Skt./ Drg.	Inter- nal Assess- ment	Phy. Edu.	Total
Maximum Marks	150	150	100	100	100	100	30	30	760
1st Term	108	130	60	61	36	96	26	30	543
2nd Term	135	124	79	70	58	78	46	36	626
3rd Term	114	122	70	70	74	84	42	37	613
Total	357	376	219	201	168	258	114	90	1782
Average	119	125	73	67	56	86	38	30	594

The marks obtained by each student were totalled up and the average calculated. The students were promoted to the next higher class on the basis of the average marks secured by them in the three examinations conducted during the year.

The results during 1965-66 and 1966-67, the years under report were better both qualitatively and quantitatively than in 1963-64 and 1964-65 in class six indicated in Table 2 given below:

TABLE 2  
RESULT STATEMENT OF CLASS VI

Year	No. of Students	Passed	Promoted	Failed	Percentage
1963-64	90	17	60	13	19
1964-65	94	20	53	21	21
1965-66	120	64	45	11	53
1966-67	95	36	47	12	38

TABLE 3  
RESULT STATEMENT OF CLASS VII

Year	No. of Students	Passed	Promoted	Failed	Percentage
1966-67	122	39	65	18	32

The above result statement of class VI clearly reveals that the pass percentage as shown in col. no. 6 is higher in 1965-66 and 1966-67 than in 1963-64 and 1964-65 and the number of failures was comparatively small. Clear pass percentage in class VII in 1966-67 was 32 and this was due to certain unavoidable factors such as large size classes, frequent changes in time table because of frequent transfer of teachers directly concerned with the class.



#### IV. CONCLUSIONS

1. Students and teachers worked regularly and systematically throughout the year which resulted in better achievement than in the previous year.

2. Results were better both qualitatively and quantitatively.

3. Element of chance was minimized to a considerable extent as the result was based on the whole year's work.

The investigator feels that the hypothesis is proved.

#### V. DIFFICULTIES

##### Limitations

1. *Transfer of Teachers* : Transfer of teachers during the academic session proved a hindrance in the smooth functioning of the project.

2. *Large Class* : Average size of the class was 61 due to which the teachers could not devote individual attention to students in a period of 30 minutes.

3. *Lack of facilities* : Lack of facilities in the school such as accomodation, furniture, teaching aids, etc. was there under which the project was conducted.

4. Admission of students from time to time made it difficult to apply the same criteria of promotion to one and all.

5. Students who got admission in this school after passing their fifth class from some other schools could not keep pace with those who passed from this school.

#### VI. FOLLOW-UP PROGRAMME

In view of the encouraging results of this project conducted in class VI in 1965-66, the investigator extended it to class VII during 1966-67. But now it has been decided to continue it in classes VI & VII only in order to consolidate the achievements of the past two years and introduce it in class VIII. In this connection a meeting of all heads of the institutions of R.S. Pura, Tehsil was convened to explore the possibility of conducting the experimental project on a large scale in a number of schools.



Project Report 8

STUDYING PUPILS' REACTIONS TO THE  
SHORT ANSWER TYPE QUESTIONS  
IN MATHEMATICS, HINDI AND  
SOCIAL STUDIES



Sardar Patel Vinay Mandir  
Ode, GUJARAT  
1965-66

## I. INTRODUCTION

### Need

The pupils are generally found weak and backward in Mathematics, Social Studies and Hindi. Students seeking admission to this school in standard VIII are not well equipped with the minimum quantum of knowledge required for further study. Set type of question paper leads pupils to cramming and speculation. So it was decided to try out short answer and objective type question papers in order to develop reading habits among the pupils and to help them in grasping and understanding these subjects better.

### Objectives

The following objectives were formulated :

- (1) To cover the syllabus in its entirety
- (2) To evaluate the concepts and understanding involved in the syllabus
- (3) To make the students read the subject intensively
- (4) To study the reaction of students towards essay type question papers and short answer and objective type tests
- (5) To compare the achievement of the students on both type of tests

## II. PROCEDURE

### Formation of Groups

In September 1965 the tests were given to pupils of Section C and D of standard VIII in Mathematics, Social Studies and Hindi. The data collected by these tests served as a base line data. These data were also used to form two comparable groups. These groups were formed in the following way.

Students securing the same number of marks were included

in one list. Separate lists were made for students securing different marks. Then the students were divided equally into two groups on the basis of these lists. Suppose there are seven students getting 35 marks, 4 students were put in one group and the others were put in the second group. One group was termed "The experimental group" and the other "The control group". Thus all the students of standard VIII were divided into two comparable groups as above. This method was adopted in grouping the students in Mathematics, Social Studies and Hindi. So there were two separate groups in each subject.

### Interview

After the grouping was done students were selected at random for an interview. Five students were selected from each group in each subject. Purpose of the interview was to find out the existing actual study habits of the pupils and the way they prepare for the periodical examinations.

In all thirty students were interviewed. The questions put to them are given below. Their answers were noted and recorded. The data served as base line data.

### Questions

1. Do you write blackboard notes regularly ?
2. When do you study for the test ?
3. Do you study only the text books ?
4. Do you study only class notes ?
5. Do you study text books and class notes ?
6. Do you read books other than the texts and notes ?  
If so, what ?
7. Do you prepare the whole course ?
8. Do you prepare only the important questions and answers ?
9. Do you think before answering the questions in the test ?
10. Do you read the whole question paper before you start writing ?



11. Which question do you attempt first ?
12. How do you solve your difficulties encountered while preparing for the test ?

The experimental group was given short answer type and objective type questions in their periodical tests while control group in each subject was given an usual essay-type question paper in their tests.

While preparing these two types of tests the following points were kept in view :—

- (i) difficulty value
- (ii) the content to be tested
- (iii) number of marks and scheme of assignment
- (iv) time factor

All the above factors were controlled in the following way :—

*Difficulty Value* : Groups of teachers were asked to determine the appropriate difficulty values of the questions from which the questions having nearly equal difficulty values were included in the tests for the periodical examinations.

*Coverage of Content* : While preparing short answer and objective type questions, the content was kept in mind.

*Marks and Scheme of Assignment* : Equal marks were assigned to two types of papers. Scheme of assessment was always considered before assessing the test papers. This was particularly done with a view to bring the element of objectivity in assessing essay type questions.

The time allotted for answering both the types of tests was also equal.

The content covered in the experimental group as well as in the control group was the same. Topics for the test were also the same. All the topics were taught to both the groups in the same manner and through one method. Each test was assigned 30 marks. In essay type test questions varied carrying from 4 to 10 marks.

In short answer and objective type test each short question carried 3 marks and each objective type test carried 1/2 to 1 mark.

Internal option was given in essay type question test while no option was given in short answer and objective type test.

In all four tests were given to both the groups. In the final test common question paper of usual type (filling the gaps, short answer questions, short notes, essay type questions, etc.) was given to both the groups. The marks of all the four tests and final test were analysed and studied. At the end of the year the same pupils were interviewed again with a view to find out their reaction to essay type, short answer and objective type of questions.

### **Interview Results Before the Experiment**

- (1) Most of the students were in the habit of taking down blackboard summary and preparing their class notes.
- (2) Most of the students studied in the morning from 7.00 a.m. to 9.00 a.m. and at night from 9.00 p.m. at 10.00 p.m.
- (3) Most of the students prepared themselves with the help of class notes, guides and important questions.
- (4) Most of them did not go through the text books even once a year and did not prepare themselves for the whole course.
- (5) They had to think a lot before answering the questions in the test.
- (6) After going through the whole question paper, they selected questions to be attempted and wrote answers of questions which they knew better.
- (7) They solved their difficulties with the help of parents and students and a few sometimes consulted teachers also.

### **After the Experiment**

- (1) Students try to get clarified the difficulties from the teacher or some elders.
- (2) Students read the whole question paper first and then they select such questions to be attempted which they can answer in the best way.



- (3) Students taking short answer and objective type question tests have to study the text thoroughly.
- (4) Majority of the students have to think before making an attempt to write the answers.
- (5) Pupils prefer objective type questions to essay type questions because for objective type questions they have to write less and do not experience language difficulty.
- (6) Cramming did not help them much in taking new type of tests.
- (7) Clarification of the concepts and understandings was involved.

The tables on the following pages show the analysis of marks.

### III. ANALYSIS AND INTERPRETATION OF THE DATA

#### Mathematics

(1) No student secured above 70% marks in the first two tests. Number of students passing in the experimental group is more than that in the control group in other tests.

(2) Number of students securing marks between 50% and 59% in the experimental group is more than that of the control group in all the tests except the V test.

(3) Number of students securing marks between 40% and 49% in the experimental group is less than that of control group in 2nd, 4th and 5th tests whereas only in test III the number of students in the experimental group is more than that of the control group.

(4) More students secured marks below 40% in the experimental group in 2nd and 5th tests while students in control group got more marks in 1st, 3rd and 4th tests.

From the above it can be concluded that between 50% and 100% marks experimental group is in a better position. This can be attributed to short question and answer type tests.

#### Social Studies

(1) One student from the control group secured more than 70% marks in each test.



TABLE 1

## SOCIAL STUDIES

Class Intervals	Test I		Test II		Test III		Test IV		Test V	
	*Exp. Gr.	C. Gr.	*Exp. Gr.	C. Gr.	*Exp. Gr.	C. Gr.	*Exp. Gr.	C. Gr.	*Exp. Gr.	C. Gr.
90-99	0	0	0	0	0	0	0	1	0	0
80-89	1	0	0	0	0	0	1	0	0	0
70-79	0	0	0	1	0	2	1	1	0	1
60-69	4	1	1	0	4	3	3	0	1	3
50-59	5	1	2	0	2	5	5	8	2	13
40-49	10	8	5	2	11	14	12	7	14	8
30-39	5	9	7	9	12	4	10	12	12	7
20-29	9	9	12	11	5	4	7	3	12	1
10-19	4	3	10	10	1	2	0	2	0	
00-09	2	3	4	1	1	1				
Absent	1				3					
Total	41	34	41	34	40	34	41	34	41	34
Mean	43.47	34.18	24.78	24.67	34.28	34.50	34.43	29.56	33.73	34.34

\*1. Exp. Gr. means Experimental Group

2. C. Gr. means Controlled Group

TABLE 2

## HINDI

Class Intervals	Test I		Test II		Test III		Test IV		Test V	
	Exp. Gr.	C. Gr.	Exp. Gr.	C. Gr.	Exp. Gr.	C. Gr.	Exp. Gr.	C. Gr.	Exp. Gr.	C. Gr.
90-99	—	—	—	—	—	—	—	—	—	—
80-89	—	—	—	—	—	—	—	—	—	—
70-79	—	—	—	—	—	—	—	—	—	—
60-69	2	1	2	1	1	1	2	1	1	—
50-59	2	2	3	3	4	4	8	3	2	4
40-49	12	4	12	10	11	10	6	5	10	5
30-39	4	7	8	10	5	3	8	7	13	16
20-29	7	5	9	7	4	6	6	2	4	7
10-19	3	9	1	5	—	1	1	—	6	3
00-09	4	2	3	2	—	—	—	1	1	2
Absent	4	2	—	—	7	5	1	3	—	1
Total	38	38	38	38	38	38	38	38	37	38
Mean	34.42	34.37	34.60	34.40	54.57	44.52	54.73	64.19	34.45	34.34

\*1. Exp. Gr. means Experimental Group

2. C. Gr. means Controlled Group

TABLE 3

## MATHEMATICS

Class Intervals	Test I		Test II		Test III		Test IV		Test V	
	*Exp. Gr.	C. Gr.	*Exp. Gr.	C. Gr.	*Exp. Gr.	C. Gr.	*Exp. Gr.	C. Gr.	*Exp. Gr.	C. Gr.
90-99	—	—	—	—	—	—	2	2	—	—
80-89	—	—	—	—	—	—	2	4	1	—
70-79	—	—	—	—	2	1	4	1	1	—
60-69	1	—	3	1	1	—	2	1	1	—
50-59	4	1	2	2	3	1	4	0	1	2
40-49	5	5	1	3	3	2	4	5	2	4
30-39	8	2	8	6	3	4	5	10	6	1
20-29	7	3	7	1	10	10	9	7	3	9
10-19	9	7	7	12	7	7	6	1	13	11
00-09	3	16	10	11	7	8	—	4	10	8
Absent	1	2	—	1	2	3	—	2	—	—
Total	38	36	38	37	38	37	38	37	38	37
Mean	25.01	14.79	24.52	15.14	24.70	24.36	35.30	35.04	15.36	15.39

\*1. Exp. Gr. means Experimental Group

2. C. Gr. means Controlled Group



TABLE 4

Tests	Test I			Test II			Test III		
	Maths. *Exp. C. Gr.	Soc. St. C. Gr.	Hindi C. Gr.	Maths. C. Gr.	Soc. St. C. Gr.	Hindi C. Gr.	Maths. C. Gr.	Soc. St. C. Gr.	Hindi C. Gr.
1. Above 70%	—	1	0	—	—	—	2	—	1
2. Between 50 & 69%	5	9	4	5	3	0	4	3	6
3. Between 40 & 49%	5	10	12	1	3	5	3	2	2
4. Below 40%	27	28	20	24	22	25	32	30	33
	Test IV			Test V			Test VI		
	Maths. Exp. C. Gr.	Soc. St. C. Gr.	Hindi C. Gr.	Maths. Exp. C. Gr.	Soc. St. C. Gr.	Hindi C. Gr.	Maths. Exp. C. Gr.	Soc. St. C. Gr.	Hindi C. Gr.
1. Above 70%	8	5	2	1	7	17	—	1	—
2. Between 50 & 69%	6	3	5	1	14	8	4	1	3
3. Between 40 & 49%	4	5	5	8	8	7	4	2	10
4. Below 40%	20	22	29	24	9	6	32	38	24

\*1. Exp. Gr. means Experimental Group

2. C. Gr. means Controlled Group

(2) More students from the experimental group secured marks between 50% and 69%.

(3) Except in tests 1 and 2 more students from the control group scored marks between 40% and 49%.

(4) Except in test 1 more students from the experimental group scored marks below 40%.

From the above it can be concluded that more students from the experimental group got marks between 50% and 69% and below 40%, while more students from the control group got marks between 40% and 49%.

### Hindi

(1) In 2nd and 5th tests no student scored above 70% marks. But in the 3rd test number of students passing from the experimental group is greater than that from the control group.

(2) Only in 1st and 5th tests number of students getting marks between 50% and 69% in the control group is higher whereas in second, third and fourth tests the case is quite reverse.

(3) Number of students scoring marks between 40% and 49% is greater in the experimental group.

(4) Number of students getting below 40% marks in the control group exceeds that in the experimental group.

From the above it may be concluded that more students from the experimental group obtained marks between 40% and 49%.

CUMULATIVE RECORD BOOKS  
FOR  
INTERNAL ASSESSMENT



M. PADMANABHAN



High School Mundathicode  
Trichur,  
KERALA  
1967-68



## ACKNOWLEDGEMENTS

The Investigator would like to express his thanks to the Headmaster and to the members of the research committee of the High School, Mundathicode for their help and guidance in conducting the project.

## I. INTRODUCTION

### Need

Regularity is a key note in learning because it reinforces knowledge gathered by a pupil. At present the pupils are usually negligent of their curricular work. To check this habit one of the several ways is the use of Cumulative Record Book for internal assessment.

At present the school has no system of maintaining cumulative records for internal assessment. Only progress report cards are used at present in some schools but these are not helpful in regulating their study habits. Hence, the investigator decided to introduce it in his school on an experimental basis.

### Delimitations

Standards VIII A and VIII D of the school were selected for the project. Standard VIII D was treated as the experimental group and standard VIII A as the control group. The project was carried out by the investigator in the school during the academic year 1967-68

### Hypothesis

Cumulative Record Book for internal assessment may help pupils in regulating their study and teachers in developing better teacher-parent relationship.

## II. PROCEDURE

Standard VIII D consisted of 37 boys and VIII A of 36 boys. In the beginning of the year the two groups were tested. The result was almost satisfactory. Two weeks were spent to put the boys in the suitable mettle because the aim was to

make a comparative study between the boys for whom cumulative records are maintained and for whom they are not maintained. Cumulative record books were started for the pupils of VIII D as it was the experimental group but no such records were maintained for students of VIII A as it was the control group.

A meeting of the guardians was held and the project was explained to them. A meeting of the pupils also was arranged wherein certain details about the project were explained to them. The cumulative record book contained Form I and II. In Form I, the first page contained the name, standard and the name of the school. Page two had other details about the pupil such as the name of parent, address, age, date of birth, profession of parents, economic status of the family, etc. These were all carefully filled in with the help of guardians/parents. Page three carried test scores. In Form I, the day to day activities of the pupils were recorded.

TABLE 1  
TEST SCORES OF EXPERIMENTAL GROUP

<i>Grades :</i>	<i>Mathematics No. of Students</i>				<i>Grades :</i>	<i>Gen. Science No. of Students</i>			
	<i>A</i>	<i>B</i>	<i>C</i>	<i>Absent</i>		<i>A</i>	<i>B</i>	<i>C</i>	<i>Absent</i>
<i>Months</i>									
June	3	13	19	2		3	20	10	4
July	5	16	16	—		6	18	9	4
August	5	11	18	3		5	13	14	5
Sept.	4	13	18	2		7	15	13	2
Oct.	8	14	11	2		7	17	12	1
Nov.	9	17	11	—		7	15	13	2

Grade A above 60%

Grade B between 50% and 60%

Grade C between 35% and 50%



Six tests were conducted in mathematics and general science for both the groups. Besides, two oral tests were conducted and scores were recorded. Similar tests were also arranged for standard VIII A, the control group. The scores were noted in the investigators daily diary. The data obtained from the tests and report of the co-curricular activities are given in Tables 1—7.

TABLE 2  
TEST SCORES OF CONTROL GROUP

Grades	Mathematics No. of Students				Gen. Science No. of Students			
	A	B	C	Absent	A	B	C	Absent
<i>Months</i>								
June	2	16	12	6	1	14	17	4
July	3	14	10	10	1	13	20	2
August	4	17	12	3	—	15	18	3
Sept.	3	13	14	6	2	14	18	2
Oct.	4	11	16	5	3	18	14	1
Nov.	3	12	17	4	2	16	18	—

TABLE 3  
DATA REGARDING LATE COMERS

<i>Months</i>	<i>Experiment Group No. of late comers</i>	<i>Control Group No. of late comers</i>
June	18	16
July	14	15
August	9	18
September	6	17
October	4	13
November	5	14

TABLE 4

NUMBER OF DEFAULTERS IN SUBMITTING ASSIGNMENTS  
IN MATHEMATICS AND GEN. SCIENCE  
TAKEN TOGETHER

<i>Months</i>	<i>Experimental Group No. of Defaulters</i>	<i>Control Group No. of Defaulters</i>
June	9	18
July	6	14
August	8	20
September	5	13
October	6	14
November	3	19

TABLE 5

NUMBER OF PUPILS SEEKING CLARIFICATIONS

<i>Months</i>	<i>Experimental Group No. of Pupils</i>	<i>Control Group No. of Pupils</i>
June	4	—
July	9	—
August	13	3
September	11	5
October	13	4
November	15	3
		6

TABLE 6

NUMBER OF MISCHIEF MAKERS

<i>Months</i>	<i>Experimental Group No. of Pupils</i>	<i>Control Group No. of Pupils</i>
June	—	—
July	3	—
August	5	2
September	3	3
October	—	3
November	3	2
		2

TABLE 7  
NUMBER OF PARTICIPANTS IN THE ACTIVITIES CONCERNING  
YOUTH FESTIVAL

<i>Item</i>	<i>Experimental Group No. of Pupils</i>	<i>Control Group No. of Pupils</i>
One Act Play	2	1
Essay Writing	12	4
Recitation	7	3
Light Music	12	3
Pencil Drawing	4	—

### III. ANALYSIS AND INTERPRETATION OF DATA

#### Scholastic Attainments

The data were restricted to two subjects, i.e. mathematics and general science. Grades instead of scores were allotted to the pupils so as to make comparison feasible. In standard VIII D it was found that there was a continuous increase in the number of A and B grade holders. In the case of general science the number of A grade holders increased but there was a fluctuation in B grade holders. A grade maintained constant variations where B and C became complementary.

On the other hand, in case of standard VIII A the range of difference was very little and every group seemed to be inconsistent. In the month of September, 1967 both the groups showed deterioration in their achievements. Whereas the pupils of the other group continued to be passive listeners.

The two groups had the same frequency in case of mischief making. In certain months standard VIII D had more mischief makers whereas standard VIII A had less.

With regard to the extra-curricular activities, standard VIII D had scored better in all the activities. The items such as one-act play, music, drawing and literary activities were found more interesting to the boys of standard VIII D. The number of prizes won by the two groups has shown a wide range.



Thus it may be said that the boys of standard VIII D have scored better as compared with the boys of standard VIII A. VIII D division was a better division than VIII A. There was no initial difference between the two groups when the project was started. As the same teachers were handling subjects for both the groups during the year, the gains can not be attributed to staff variations.

#### IV. CONCLUSIONS

The analysis of the data collected on scholastic achievement proves that the cumulative record has induced regularity in the activities of the pupils.

The pupils of the control group at times produced better results but their achievement was not stable. A fluctuation was observed in their monthly achievement scores. This makes us to think that the lasting interest can be inculcated among pupils through these records. The oral advice given to pupils has a passing effect on them.

Another conclusion is that the influence of other variables such as student disturbances can adversely effect the regularity in their study habits. For example, in the month of September, 1967, a deterioration in achievement was registered in the case of standard VIII D. The regularity in attendance, submission of assignments, etc., is enhanced through the introduction of cumulative records. The pupils became more responsible and hardworking.

As a result of the project, pupils in experimental group became more conscious of their achievements, both inside as well as outside the classroom. In subjects like mathematics and general science they did not hesitate in clarifying their doubts unlike the other groups. Probably the students of experimental group could develop self-confidence.

## V. FOLLOW-UP

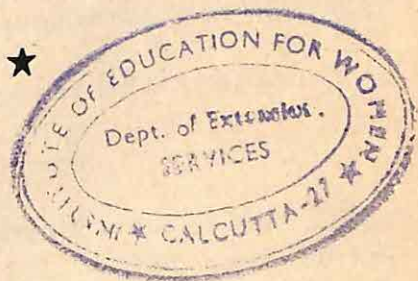
The investigator feels that the coverage of the project must be extended to other standards so that the achievements of pupils may be improved. However, care must be taken to see that the teachers involved in such projects are not on long leave and guardians/parents of the pupils take interest in the progress of their wards.

Project Report 10

# IMPROVING LEARNING OF MATHEMATICS THROUGH PROPER GROUPING OF PUPILS



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1967-68



## ACKNOWLEDGEMENTS

The investigator expresses his sense of gratitude to the Extension Services Department and Shri K. Ananta, Lecturer, Radhanath Training College, Cuttack for working as a resource person and Shri S. Mohpatra, Lecturer, Kendrapara College, Kendrapara for giving a talk to the students.

## I. INTRODUCTION

### Historical Background

One of the important subjects in the school curriculum is mathematics on the foundation of which the whole structure of modern science and technology stands. But mathematics, being a very difficult subject, only a very limited number of students in an average class is able to cope with it effectively. The diligent, sincere and talented students shine in this subject and the rest whose level of attainment is low and who are by nature insincere, inattentive, weak in grasping and understanding obtain very few marks in the subject at the examinations and consequently feel discouraged and give up its study.

My meeting with many old students who have been deprived of the accomplishment of their long cherished ambitions of life due to their failure to secure satisfactory percentage of marks in mathematics at the school final examinations, confirms the aforesaid views of mine. Having inquisitively asked as to why they fail to fare well in the subject, I was told that it was due to the following two important factors

1. The lack of adequate attention and proper teaching by the teachers
2. Teachers' failure to cope with the brilliant students of the class

### Need

I, therefore, became concerned as to how to create interest for mathematics in students and ultimately enable them to secure good percentage of marks in the school final examinations. But where there is a will there is a way. I began to feel that if the weak students in mathematics be taught together in a separate class, the weak students might do better in the subject.

Accordingly a project proposal to improve the learning in mathematics was prepared with the following objectives.

### Objectives

The following objectives were formulated.

- (1) To help the weak students in mathematics for better attainment
- (2) To reduce the heterogeneity of the classes
- (3) To do away with the feeling of inferiority complex among the weak students
- (4) To enable the teacher to identify the weaknesses of students in mathematics
- (5) To provide a suitable environment for learning, both to the weak and the bright students.
- (6) To enable the teacher to pay adequate and special attention to the weak students.

## II. PROCEDURE

### Grouping

The project was tried out in class X. All the students who had passed standard IX together with those who had been detained in class X were divided into section A and section B according to the marks secured by the students in mathematics at the annual examination of 1967. Out of 82 students, 41 students who had secured below 25% in mathematics were put in section A and the rest in section B.

TABLE 1

<i>Section</i>	<i>Marks in Mathematics</i>	<i>No. of Students</i>
X A	All below 25%	41
X B	All over 25%	41



## Diagnosis

At the outset of the project, an examination was given to the students of section A. The examination was conducted under strict supervision and the answer papers were carefully assessed. The areas of weaknesses of each student were identified. The mistakes were analysed and classified.

The types of mistakes found in general were as follows :—

- (i) notational errors
- (ii) omission of steps
- (iii) inaccurate and clumsy figures
- (iv) errors in computation
- (v) lack of correct process
- (vi) mistakes due to carelessness
- (vii) wrong use of formulae
- (viii) lack of reasoning ability
- (ix) wrong answers due to cramming

## Teaching

Section A was taught with the basic approach. Stress was given on the effective understanding of the fundamental concepts. This group was not taxed unnecessarily with deeper details or with a heavy load of practice examples. It was not overburdened with the solving of the riders in geometry. However, no portion involving a principle was left unexplained. The teachers explained to the students of this group the type of mistakes they had found in their answer papers and prepared sets of questions with a view to enable the students in understanding the concepts which were not clear to them. Each student of this group daily worked out atleast two or three problems with the help of the teachers at school. While assisting the student in problems, the teachers pointed out to them the nature or type of errors committed by them and how they might be eradicated.

The students of this section were divided into six equal groups and each group met the teachers in charge of this project once in a week after the school was over. The students worked for about half an hour with the help and co-operation of the teachers as well as with that of other students of the

group. It being a small group individual attention to each student could be paid. This also helped the teacher in understanding the weaknesses of the students better.

The students of section B were taught by usual method of teaching. Emphasis was given on self-study but help was given by the teachers whenever it was needed. Every topic of the syllabus was properly introduced by the teacher. In solving examples in arithmetic and algebra, the students of this section did not require much guidance but in tackling riders in geometry they found the job rather difficult. Their speed in this sphere did not show any marked rise.

### Remedial Measures

1. Periodical examinations were conducted in section A in order to check up the progress and achievement of the students but no such examination was given to the students of section B. Each periodical examination indicated (a) the number of students of section A who actually made some progress in general, (b) the number who had overcome their weaknesses and the extent of it, (c) the number who had attempted correctly all the questions in time and (d) the number of those had left some questions unattempted.

2. After each examination, mistakes in the answer books were analysed and classified. Mistakes were brought to the notice of the students who had to correct them. Each periodical test suggested what further remedial measures would have to be adopted in order to remove the type of mistakes found in the answer papers. One common mistake found with many students after each periodical examination was that they had left some questions unattempted. On enquiry it was learnt that it was due to the shortage of time in most of the cases. To enable the students to overcome this difficulty a general treatment was given. In every mathematics class, students were given one problem to solve within a specified time. When this was first practised, a majority of students failed to work out the given problem within the stipulated time but gradually they overcame this difficulty. After a month's practice it was found that each student of the class could work out even difficult problems within a shorter time.



3. The questions for the periodical tests were framed keeping in view the type of mistakes which had been found in the answer papers and also in the class while helping the students in solving a problem. During the course of the year, there were in all five periodical tests excluding the terminal and the annual examination. In all these examinations the recent techniques of examination were adopted as far as possible. Preference was given to a good number of objective type questions over a few essay type questions.

4. Keeping algebraic formulae fresh in mind for working out the algebraic problems is a difficult thing. In order to remember a formula, understanding of basic principles is very necessary. Therefore special attention was given to enable the students to understand the basic concepts involved in the formulae. Students were asked to prepare charts showing formulae required for their use. A few oral assignments on formulae were also given to the students of section A in order to stimulate interest in them to learn.

### Other steps

While the project was in progress, frequent use of the report of the seminar on teaching of mathematics was made. This seminar had been organised by the Board of Secondary Education, Orissa under the auspices of the University Grants Commission.

To stimulate interest in mathematics, a lecture was arranged for the students of section A. The speaker discussed at length the type of errors that students of a high school generally commit while working out mathematical problems and how these may be removed.

In order to make the learning easy and effective, the following material aids were used :—

- 1) a cube
- 2) a rectangular parallelepiped
- 3) a right circular cylinder
- 4) a triangular prism
- 5) a right circular cone
- 6) an apparatus to show the relation between the sides of a triangle



## III. EVALUATION

To evaluate the achievement of the project, an examination in mathematics was conducted. Both the sections appeared in the examination. The headmaster of the school, who is an expert in mathematics set questions for this examination. The examination was conducted in a healthy atmosphere and also under strict supervision. The questions covered the areas of weaknesses of students detected before and the papers were carefully examined. Tables 2 and 3 below show the results of the examinations.

TABLE 2  
SECTION A

	<i>Annual Exam. of the previous year on the basis of which division of the class was done</i>	<i>Examination Con- ducted on the com- pletion of the pro- ject</i>	<i>Remarks</i>
No. of Students appeared	41	30	Two remained absent
Below 30%	41	27	Even out of these 27, 13 have secur- ed more marks than what they had secured at the annual exa- mination
30%—50%	—	7	Improvement
Over 50%	—	5	Improvement
Average marks	15	25	Increased by 10 marks

TABLE 3  
SECTION B

	<i>Annual Exam. of the previous year on the basis of which the division of the class was done</i>	<i>Exam. conducted on the completion of the project</i>	<i>Remarks</i>
No. of students appeared	41	41	—
Below 30%	—	4	—
30%—50%	31	18	—
Over 50%	10	19	Improvement
Average marks	44	54.5	Increased by 10.5

## IV. ANALYSIS AND INTERPRETATION

Section A started with all the failures. Out of 39 students in this group 12 passed; 5 secured more than 50% marks and the average marks of the group increased by 10. Even out of the 27 who had failed, 13 secured more marks than before. In all, out of 39 students, 25 showed a considerable improvement. We cannot say with certainty that these students would have improved, had they continued in the heterogeneous classes.

Section B started with 41 students out of which 8 secured less marks than what each of them had secured in the previous examination. The rest 33 showed a marvellous improvement. The average marks of the section increased by 10.5.

## V. CONCLUSIONS

To conclude, it can be said with least hesitation that this new technique has the following advantages:

- (1) As the classes were homogeneous to a certain extent, teaching and learning process became relatively easy.
- (2) Teaching and learning speed was increased.
- (4) It was possible to pay attention to backward pupils.
- (5) Section A showed a marked improvement.

## VI. SUGGESTIONS FOR FOLLOW-UP

The technique tried out in this project has shown tangible results and it should be practised in schools all over India. The technique can easily be introduced in any class with more than one section, putting weak students in one section and the bright ones in the other section without bringing about any change in the normal work of the school. But what is absolutely required for the success of this scheme is a strong will to do something constructive for the students.



## APPENDIX

## SUMMARY OF RESULTS

## Section A

<i>Frequency</i>	<i>Pre-Test No. of Students</i>	<i>Post Test No. of Students</i>
Below 15	18	11
15-25	20	16
26-35	3	5
36-45	—	2
46-55	—	1
56-65	—	4
above 65	—	—
Average marks	15	25

## Section B

Below 15	Nil	Nil
15-25	Nil	3
26-35	15	8
36-45	13	5
46-55	4	8
56-65	4	4
Above 65	5	13
Average marks	44	54.3

## SOME OBSERVATIONS

Under the scheme of "Experimental Projects" financial and academic assistance has been given to about 2,000 secondary schools so far for conducting developmental and experimental projects within their organisational framework. It was decided that it will be useful to make the findings of these projects available to others so that the schools working under similar conditions may make use of the same for improvement of their programmes. Accordingly the projects which were comparatively better planned, effectively implemented and properly reported by the schools were selected for publishing in a series. Eight project reports have already been published under the title "Classroom research". For the second volume 10 reports have been selected for printing. The project reports selected for the first volume were mostly of developmental nature. Hence the reports which are mostly of experimental projects have been selected for the second volume.

At the time of selecting and editing of the reports the following points were observed :—

- 1) In most of the reports the table of content was not given. It would have been better if it had been given for the convenience of the readers.
- 2) If an investigator quotes an extract from any source or makes use of some reference material, a foot-note may be given to this effect. But in most of the reports this has not been done.
- 3) In some of the reports the need for the study has been clearly elaborated but in most of the reports it has not been stated as to why a specific problem has been selected by the school. The topic selected for the project should invariably be based on the problem concerning a particular school. It should be brief, clear and to the point. Sometimes the title of the project is vaguely mentioned.
- 4) Delimitations of the projects have not been stated clearly in most of the available reports. The investigator should clearly define the scope of the project.
- 5) Most of the reports contain details of the different methods, techniques, programmes and the steps taken to imple-



ment the project. But, except in a few cases, these details have not been given in a logical order.

6) The role of different members of the research committees like the head teacher, librarian, etc. have not been mentioned, identified in most of the reports.

7) Only in some of the reports full details about the sources and methods of collecting data have been given, while in most of the other reports this important point has been overlooked and still in some other reports this aspect has been touched in a peripheral way.

8) The details of expenditure, lengthy statistical calculations, research tools used for the study, etc have been given in the body of the reports by some of the investigators, whereas only the summary of the data in a tabular form should have been given in the main report and the rest of the relevant data could go in the appendices.

9) There are very few reports wherein the investigators have mentioned about the follow-up programme of the completed projects and the related studies which may be taken up to find solutions to the unsolved problems. This aspect is missing in most of the reports.

10) It is desirable that a brief bibliography of the references actually used during the study may be given at the end of the report in a proper form. But this important aspect has been omitted in almost all the reports, save a few.

It may, however, be said that all-told it is a worth appreciating effort by our secondary schools teachers to show interest in class room research. It is our hope that this interest will not only continue but increase in future thereby improving the quality of projects in particular and that of education in general.

—Janak Duggal



